

**ANALYTICAL AND EXPERIMENTAL INVESTIGATION OF A  
1/8-SCALE DYNAMIC MODEL OF THE  
SHUTTLE ORBITER**

**Volume IIIB -- Supporting Data**

by

P. W. Mason, H. G. Harris, J. Zalesak, and M. Bernstein

May 1974

Final Report -- Prepared Under Contract No. NAS 1-10635-12

by

Grumman Aerospace Corporation  
Bethpage, New York 11714

Langley Research Center  
Hampton, Virginia 23665

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

**ANALYTICAL AND EXPERIMENTAL INVESTIGATION OF A  
1/8-SCALE DYNAMIC MODEL OF THE  
SHUTTLE ORBITER**

**Volume IIIB – Supporting Data**

**Prepared under Contract NAS 1-10635-12**

**for the**

**Langley Research Center  
National Aeronautics and Space Administration  
Hampton, Virginia 23365**

**by**

**P. W. Mason, H. G. Harris, J. Zalesak, and M. Bernstein**

**Grumman Aerospace Corporation  
Bethpage, New York 11714**

**May 1974**

**Appendix B1**  
**NASTRAN SUBSTRUCTURING ANALYSIS FOR NORMAL MODES**  
**ALTERED RIGID FORMAT 3 FOR PHASE 1 or 2**

**"Page missing from available version"**

Missing → Appendix B14 + B17

Pages 101 + 102 missing



## APPENDIX B1

### NASTRAN SUBSTRUCTURING ANALYSIS FOR NORMAL MODES ALTERED RIGID FORMAT 3 FOR PHASE 1 OR 2

#### NOTE

Refer to Volume IIIA, Appendix A4, for NASTRAN substructuring analysis used for Model II

#### Incorporated New Bulk Parameters

- |     |                  |   |
|-----|------------------|---|
| (1) | NOSUB            | Number of substructures to be coupled in this run. Default = 1, which indicates a phase 1 run, where one substructure will be reduced.  |
| (2) | TPCOPY $\geq$ 0  | Will put reduced stiffness and mass matrix (Kaa & Maa) on tape INPT. Default = -1   |
| (3) | TPNAME           | Label name of INPT. Use only when TPCOPY $\geq$ 0   |
| (4) | RMODE $\geq$ 0   | Causes restrained free modes to be obtained. The restraints are defined in an input column partition matrix {CPAJC}, which will partition the a-set into J & C sets. Default = -1. In this case free-free modes will be obtained if there is a SUPORT card in the BULK data, defining the rigid body supports. Although {CPAJC} is not used when RMODE = -1, it must be defined in the BULK data. It is sufficient to define it as a $1 \times 1$ matrix. Also, don't forget the EIGR card if modes are to be obtained. |
| (5) | TPNAME9          | Label name of INP9, which contains the column partition vector, reduced stiffness, and mass for each reduced substructure. The column partition vectors are used to merge the reduced stiffness and mass of each reduced substructure into a common pseudo-structure lineup. Use this parameter only when NOSUB $>$ 1.  |
| (6) | TPCOFYN $\geq$ 0 | Will put the pseudostructure eigenvalues and eigenvectors in substructure lineups on tape (INP1, INP2, etc.) for further processing, in this case final substructure mode shapes. Default = -1.   |
| (7) | TPNAMEN          | Common label name of INP1, INP2, etc. Use only when TPCOFYN $\geq$ 0.   |

## Incorporated New Bulk Input Matrices

The following input matrices must be defined in the BULK data on DMI cards whether they are needed or not. If they are not needed, defining them as a  $1 \times 1$  matrix will suffice.

### (1) EQR Matrix

This matrix expresses the resultants about an origin, due to unit rigid body support loads. The rigid body degrees of freedom are defined on the standard NASTRAN SUPORT card. The EQR matrix is necessary if the checks, which are incorporated in the ALTERS, are to be performed. The origin chosen, should be the same origin defined on the standard GRDPNT parameter card.

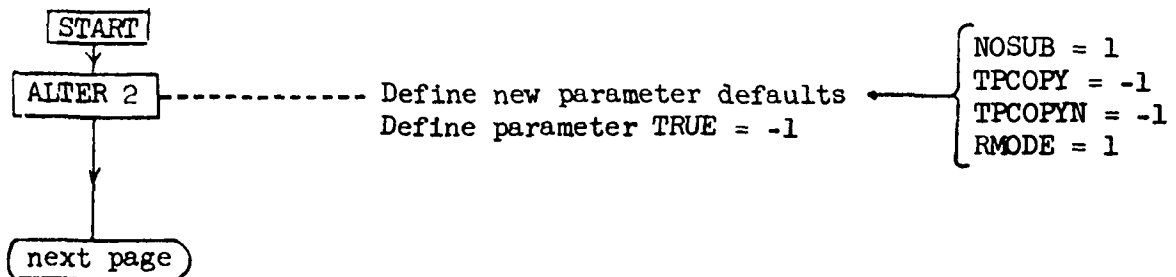
### (2) CPAJC Matrix

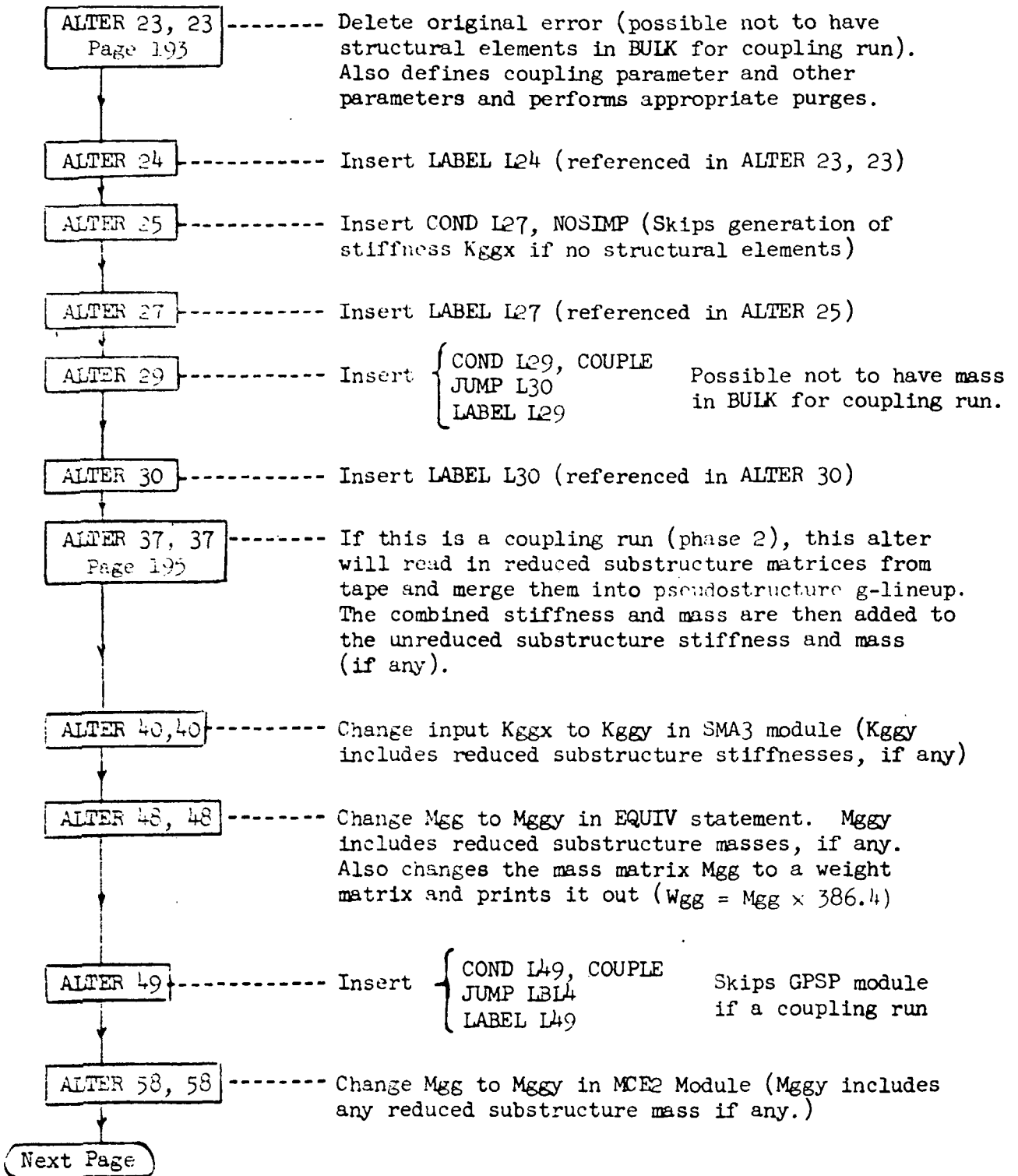
This matrix is used when restrained-free modes are to be obtained (RMODE=1). This matrix is a column partitioning vector which defines the restrained degrees of freedom from the analysis set (a-set) degrees of freedom.

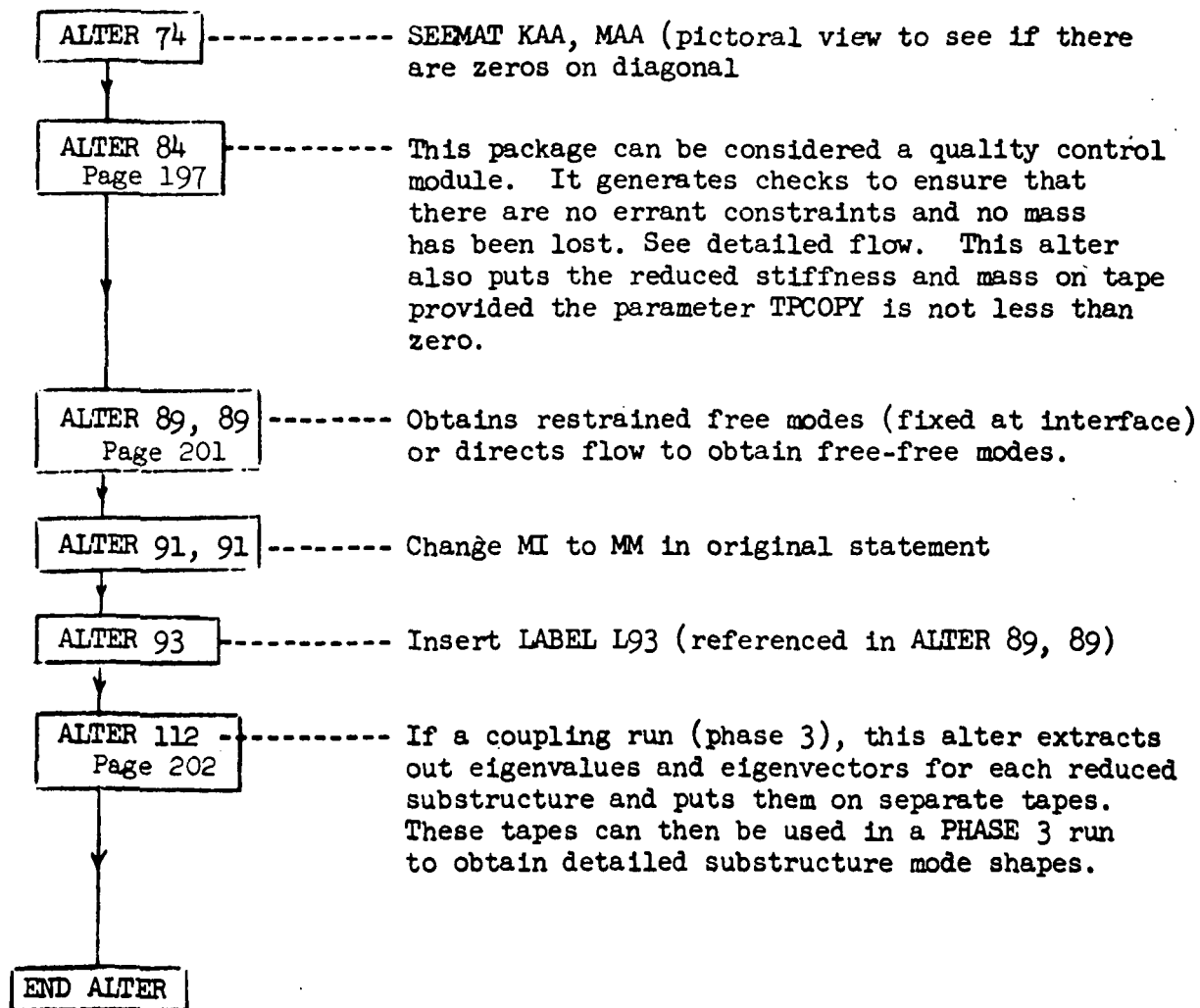
### IMPORTANT NOTE:

When doing a coupling run, where all substructures have been reduced and on tape, it was necessary to input in the BULK data at least one element, to prevent a fatal error in module TAL. A thin, string-like rod will suffice. The element must be counted as a substructure so that the new NOSUB parameter was increased by one.

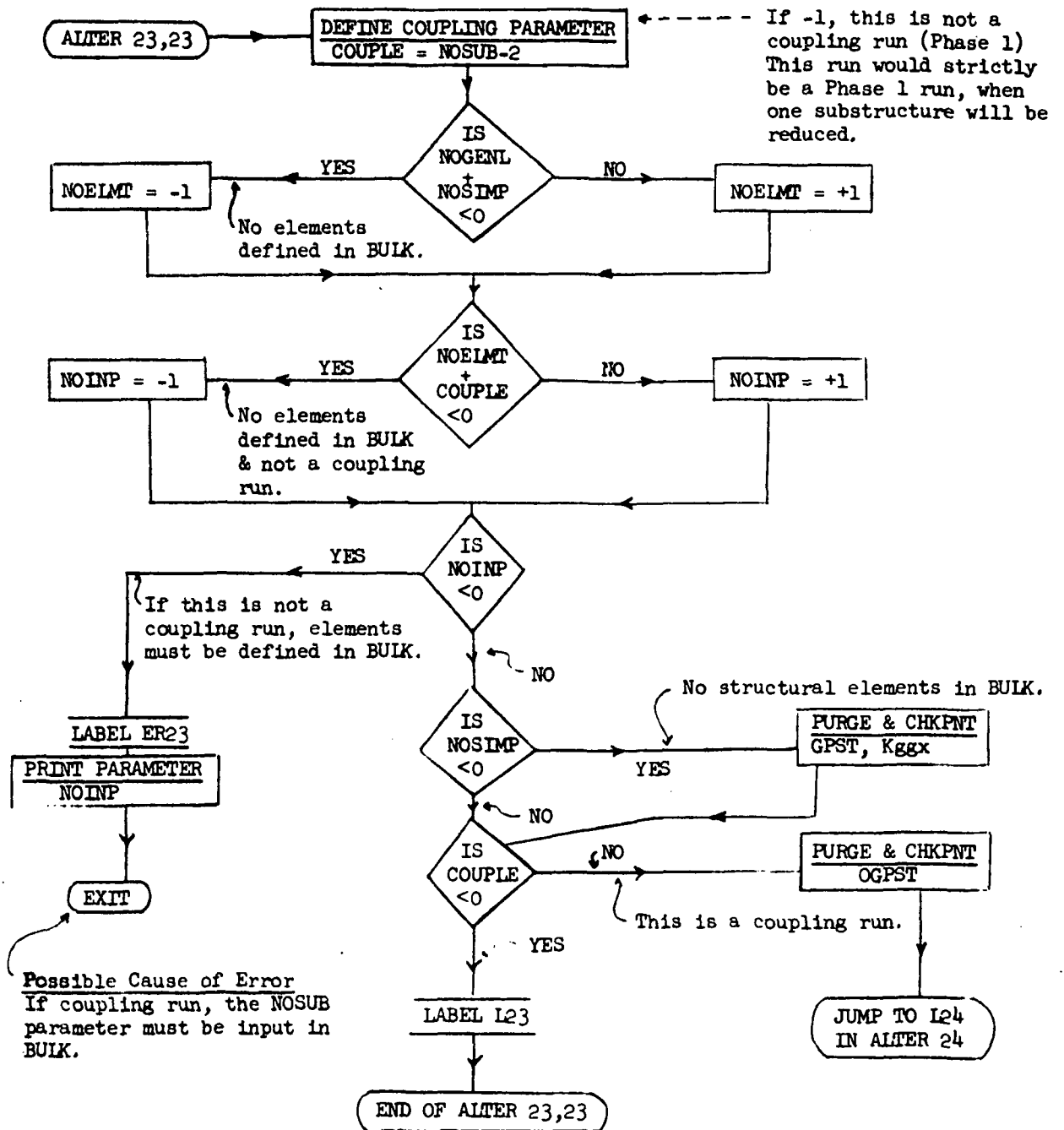
### Alters Incorporated (General Flow)



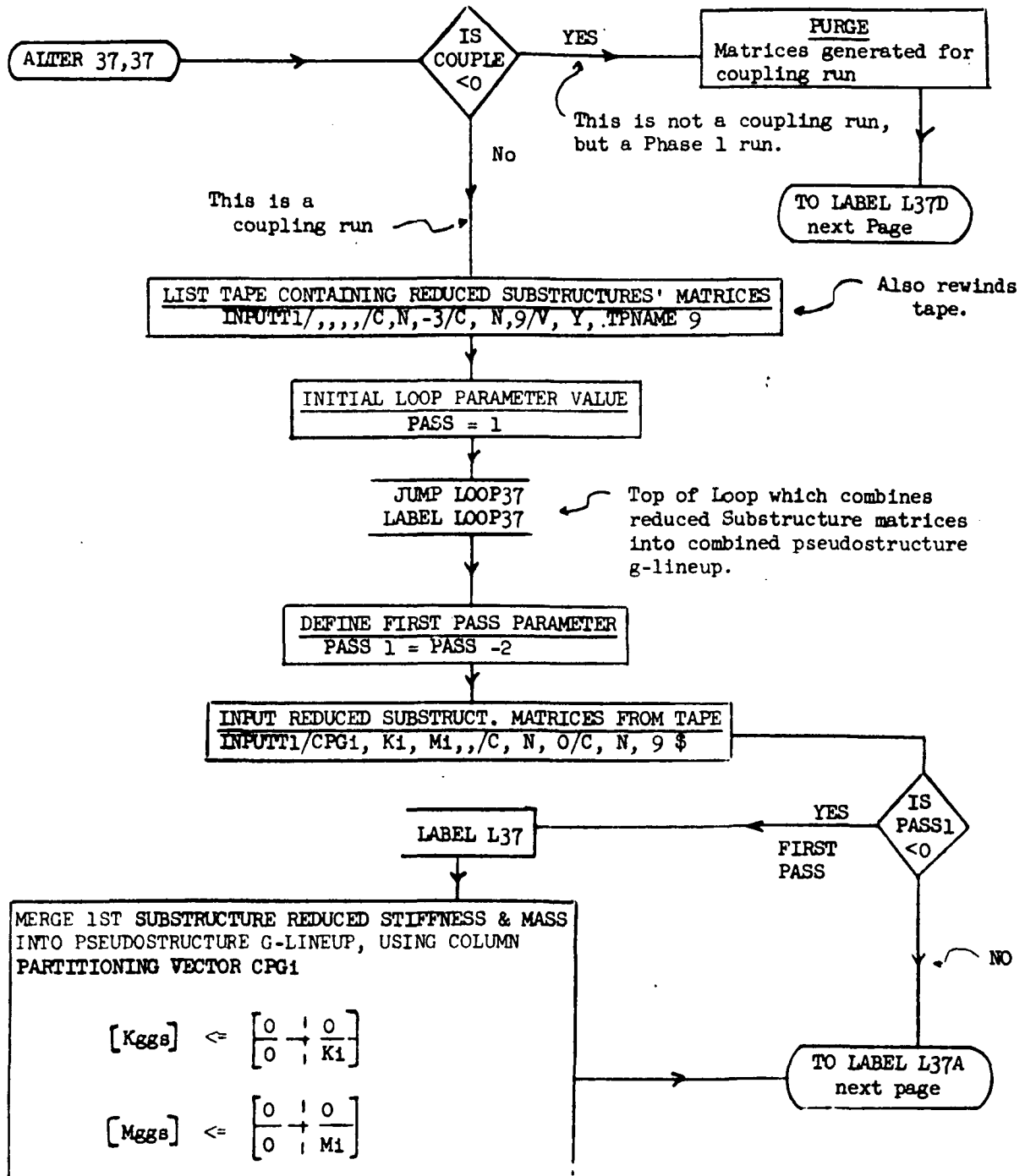


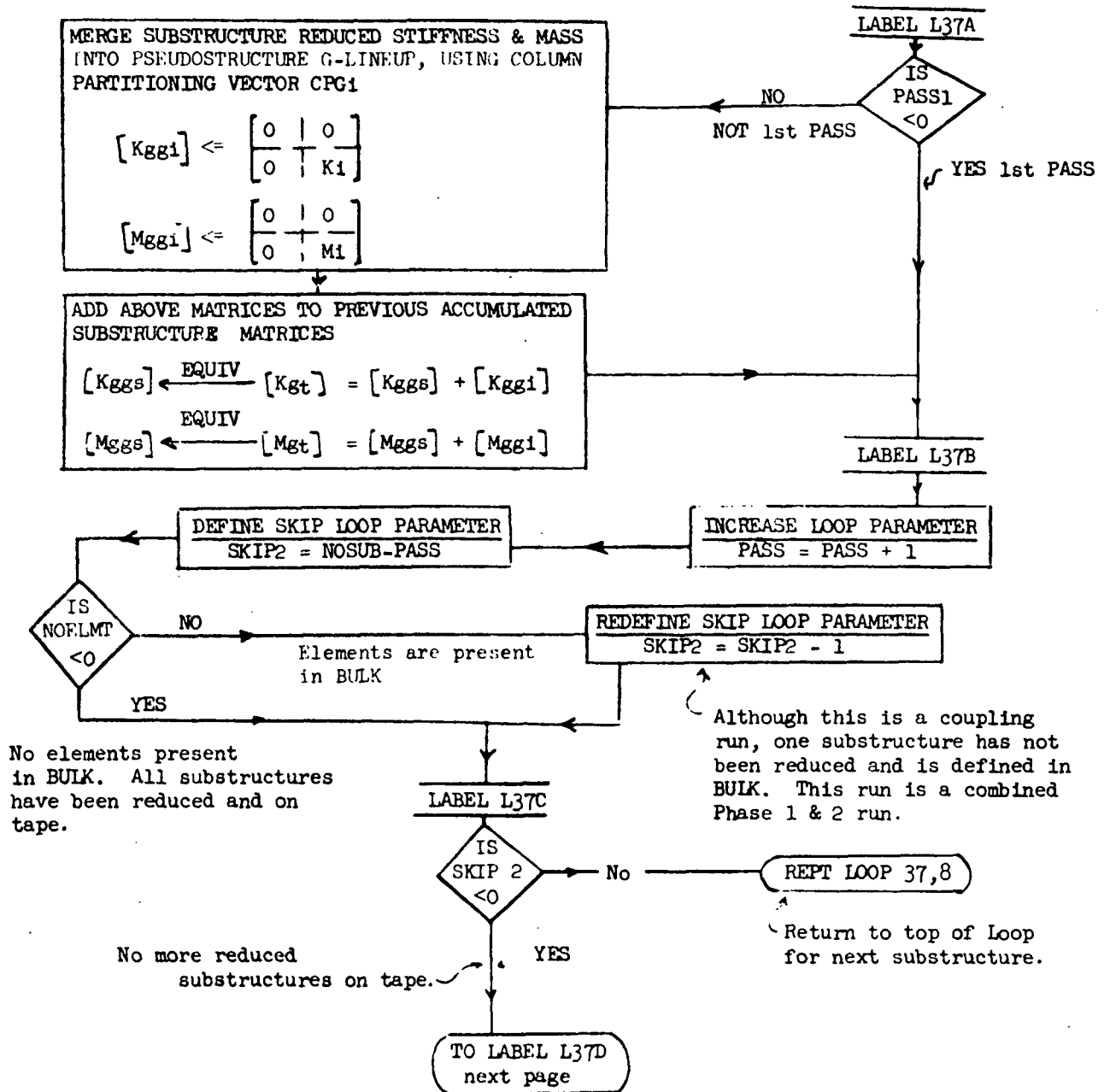


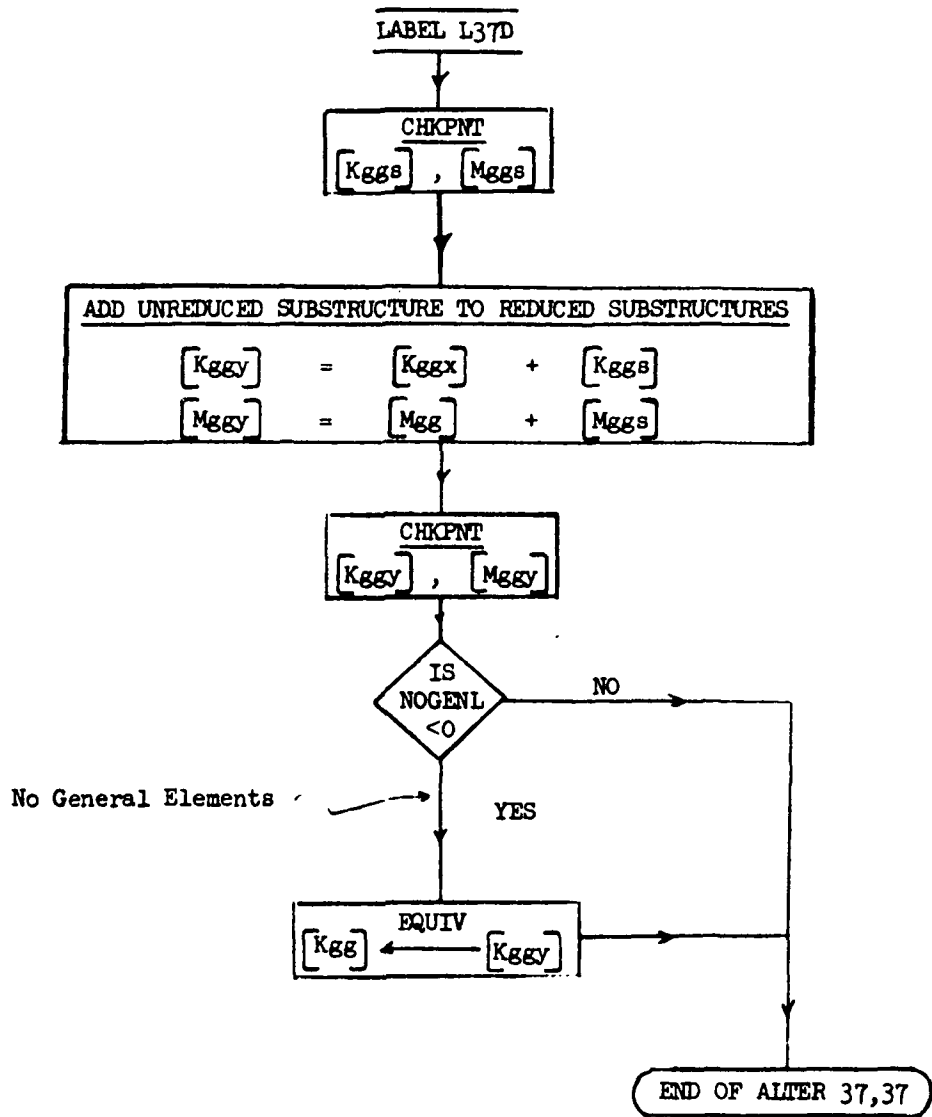
# ALTER 23,23 DETAILED FLOW



ALTER 37, 37 DETAILED FLOW



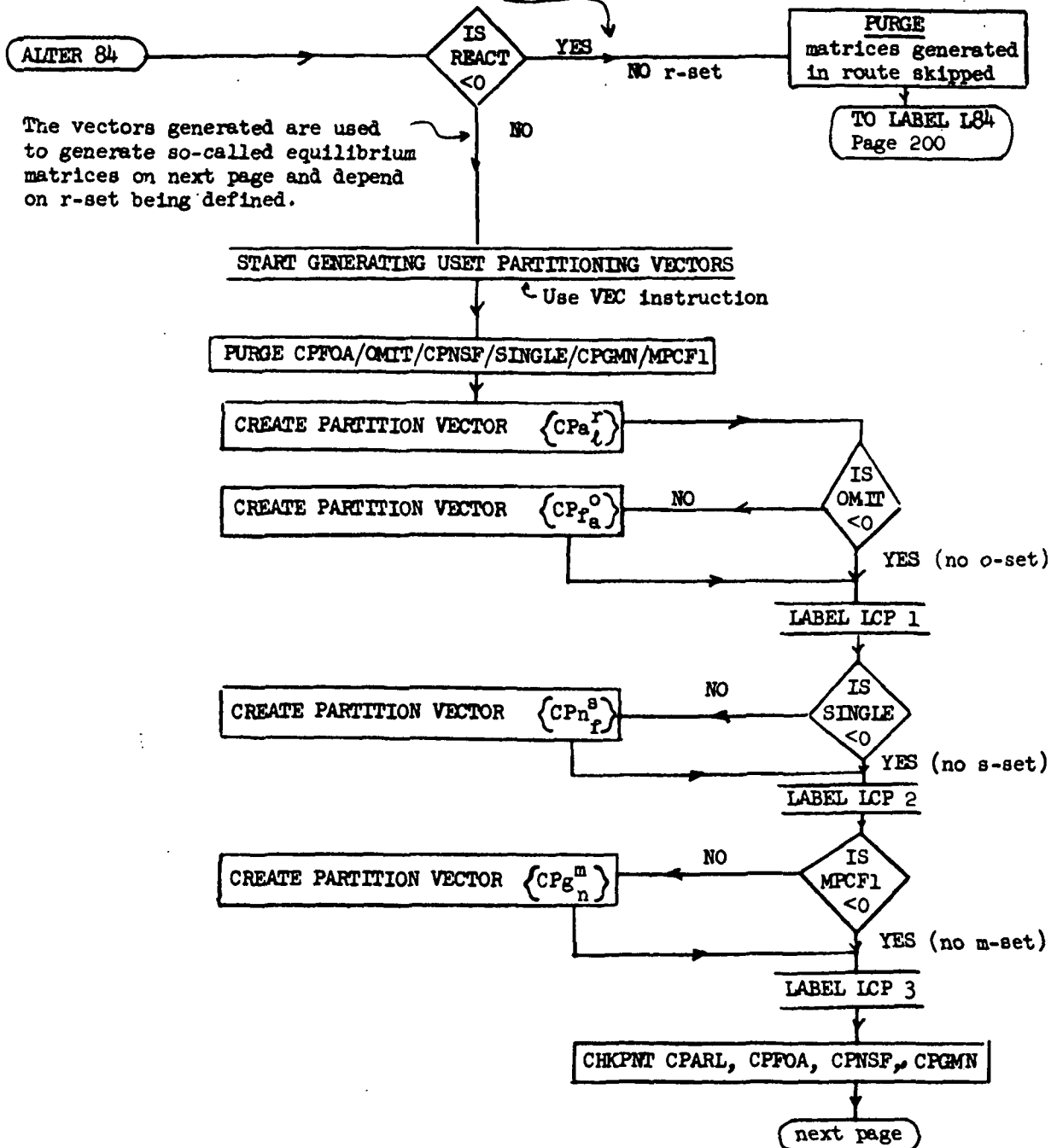






# ALTER 84 DETAILED FLOW

Note: EQR must be defined in BULK.  
A 1 x 1 matrix will suffice.



# START GENERATING EQUILIBRIUM MATRICES

**NOTE:** Equilibrium matrices express resultants about a chosen origin due to unit loads at the USET degrees of freedom. They are generated from an input matrix  $[EQR]$  and the solved structural transformations  $[Gm]$ ,  $[Go]$ , and  $[D]$ .  $EQR$  expresses resultants due to unit rigid body loads (r-set).

PURGE  $EQ_o$ /OMIT/ $EQ_m$ /MPCF1

RESULTANTS/UNIT t-SET LOADS  
 $[EQ_t] = [EQR] [D]^T$   
RESULTANTS/UNIT a-SET LOADS  
 $[EQ_a] \leftarrow [EQR \mid EQ_t]$   
 merged using  $\{CPa^r_t\}$

RESULTANTS/UNIT o-SET LOADS  
 $[EQ_o] = [EQ_a] [Go]^T$   
RESULTANTS/UNIT f-SET LOADS  
 $[EQ_f] \leftarrow [EQ_o \mid EQ_a]$   
 merged using  $\{CP_{fa}^o\}$

RESULTANTS/UNIT n-SET LOADS  
 $[EQ_n] \leftarrow [Os \mid EQ_f]$   
 merged using  $\{CR_{fn}^s\}$

IS  
OMIT  
<0

YES (No o-set)

EQUIV  
 $[EQ_f] \leftarrow [EQ_a]$

LABEL L84A

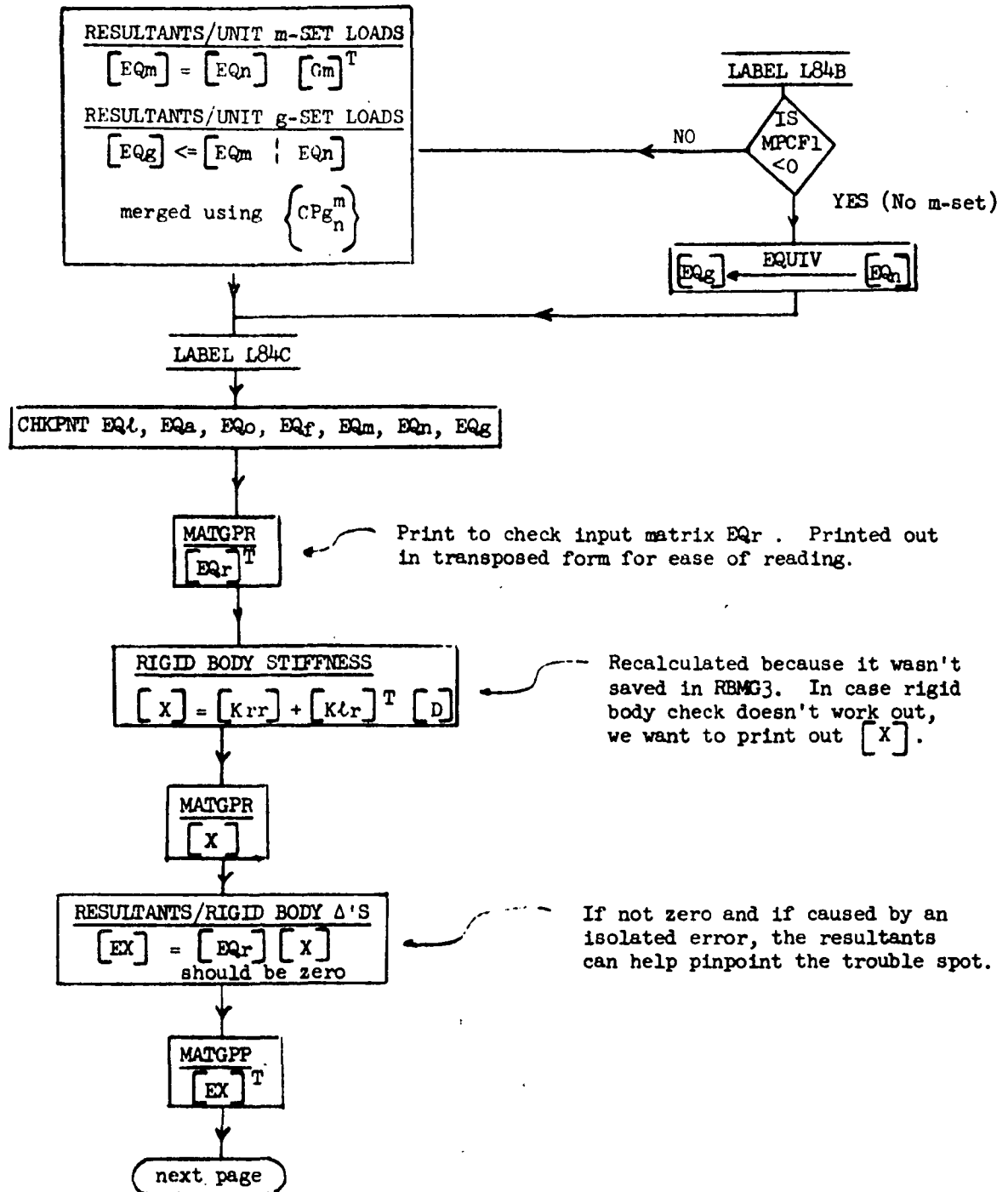
IS  
SINGLE  
<0

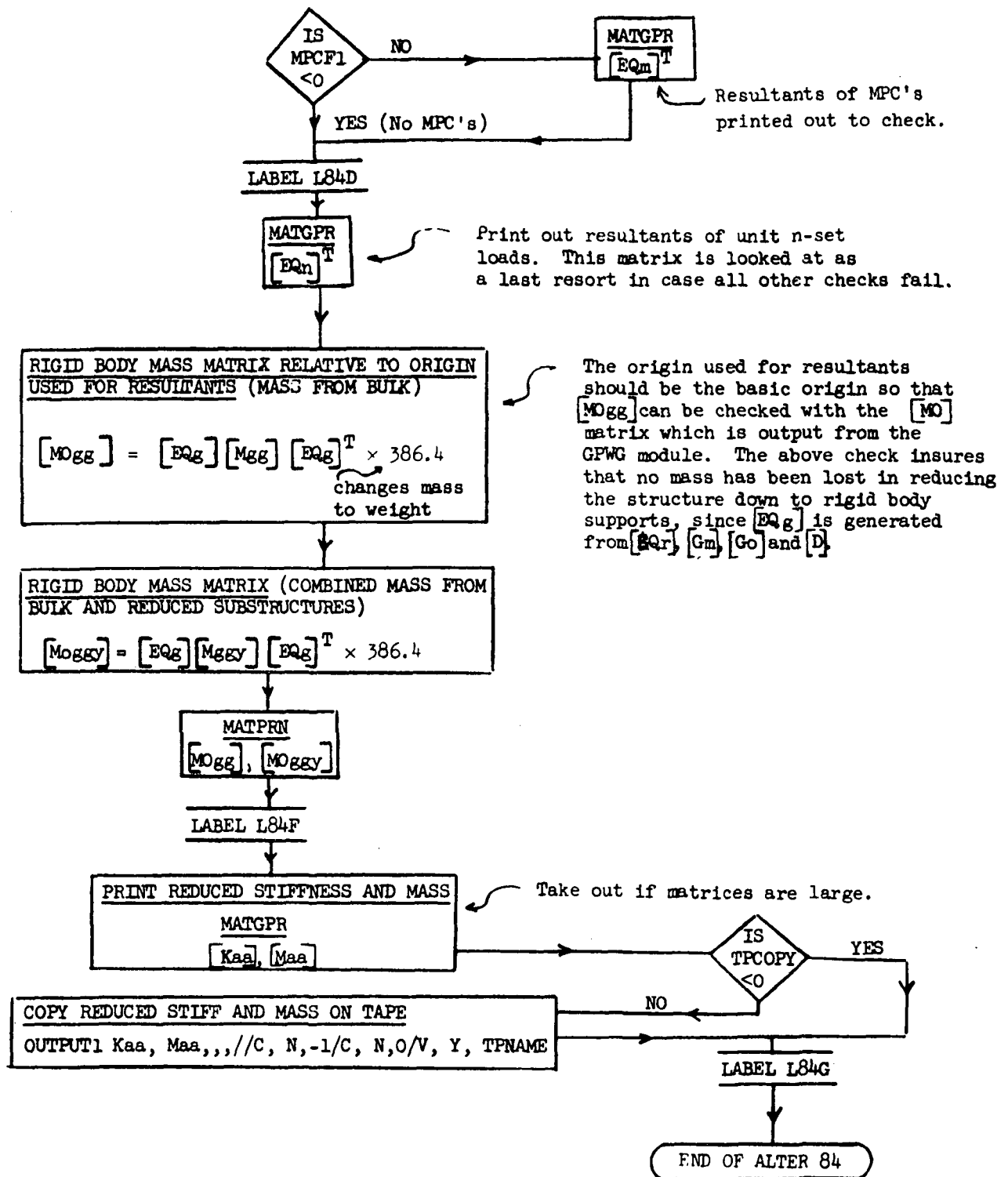
YES (No s-set)

EQUIV  
 $[EQ_n] \leftarrow [EQ_f]$

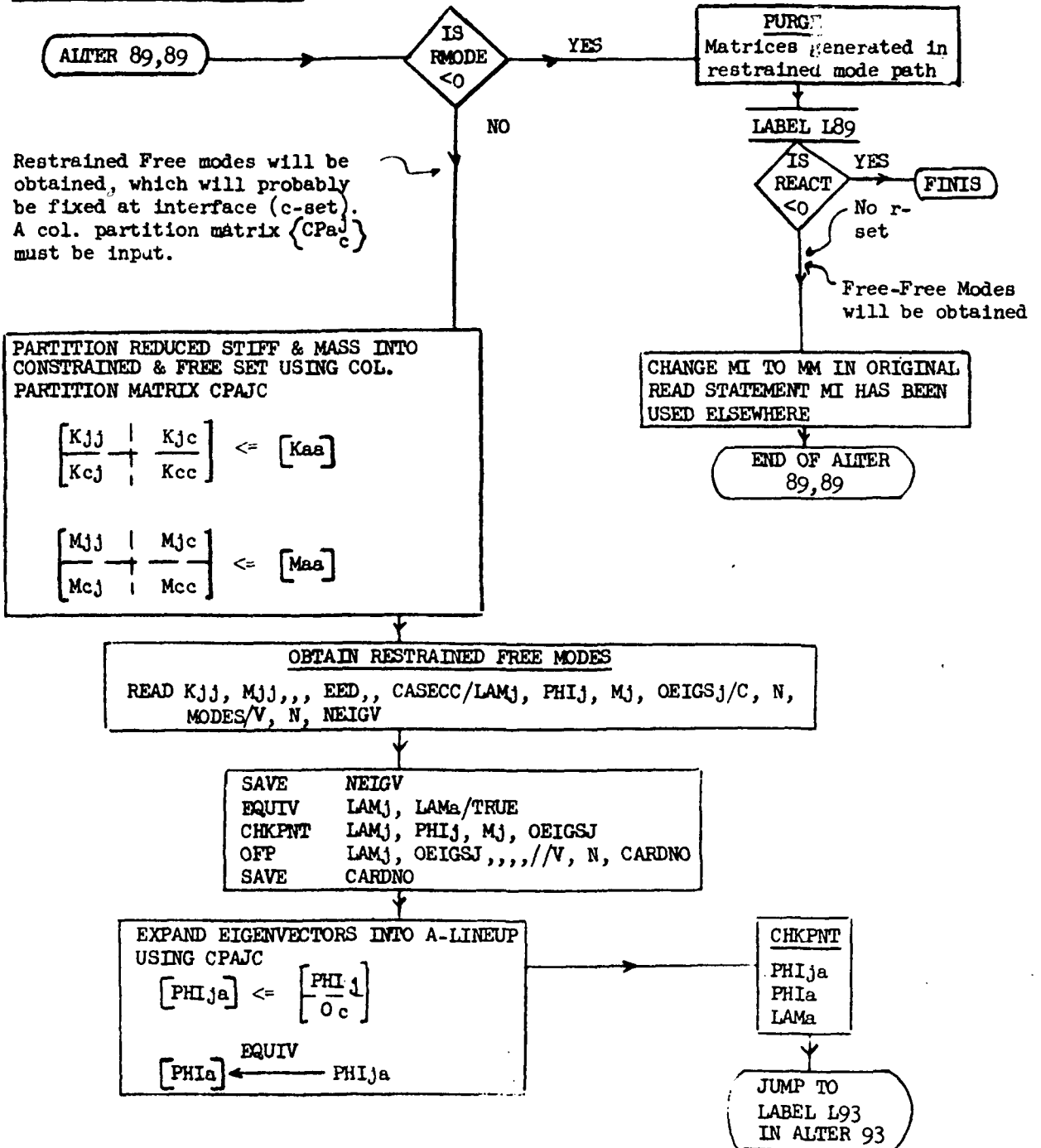
TO LABEL L84B  
 next page

Note: Resultants due to SPC unit loads cannot be obtained by this method. Therefore reserve SPC's for zero stiffness D.O.F. and sym. or anticonstraints at the plane of symmetry. If there is a plane of symmetry, the resultants expressed should be sym. or antiresultants only.

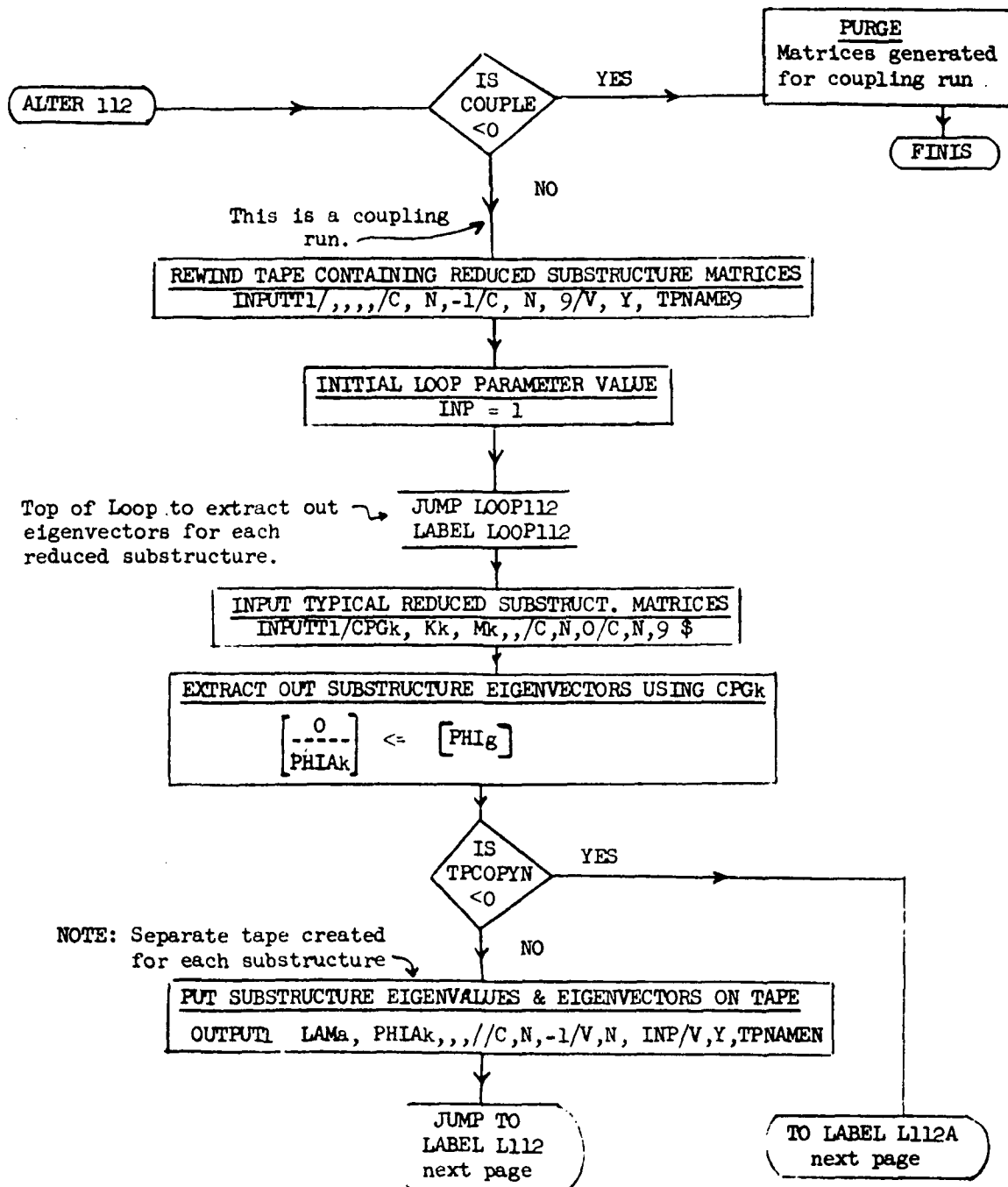


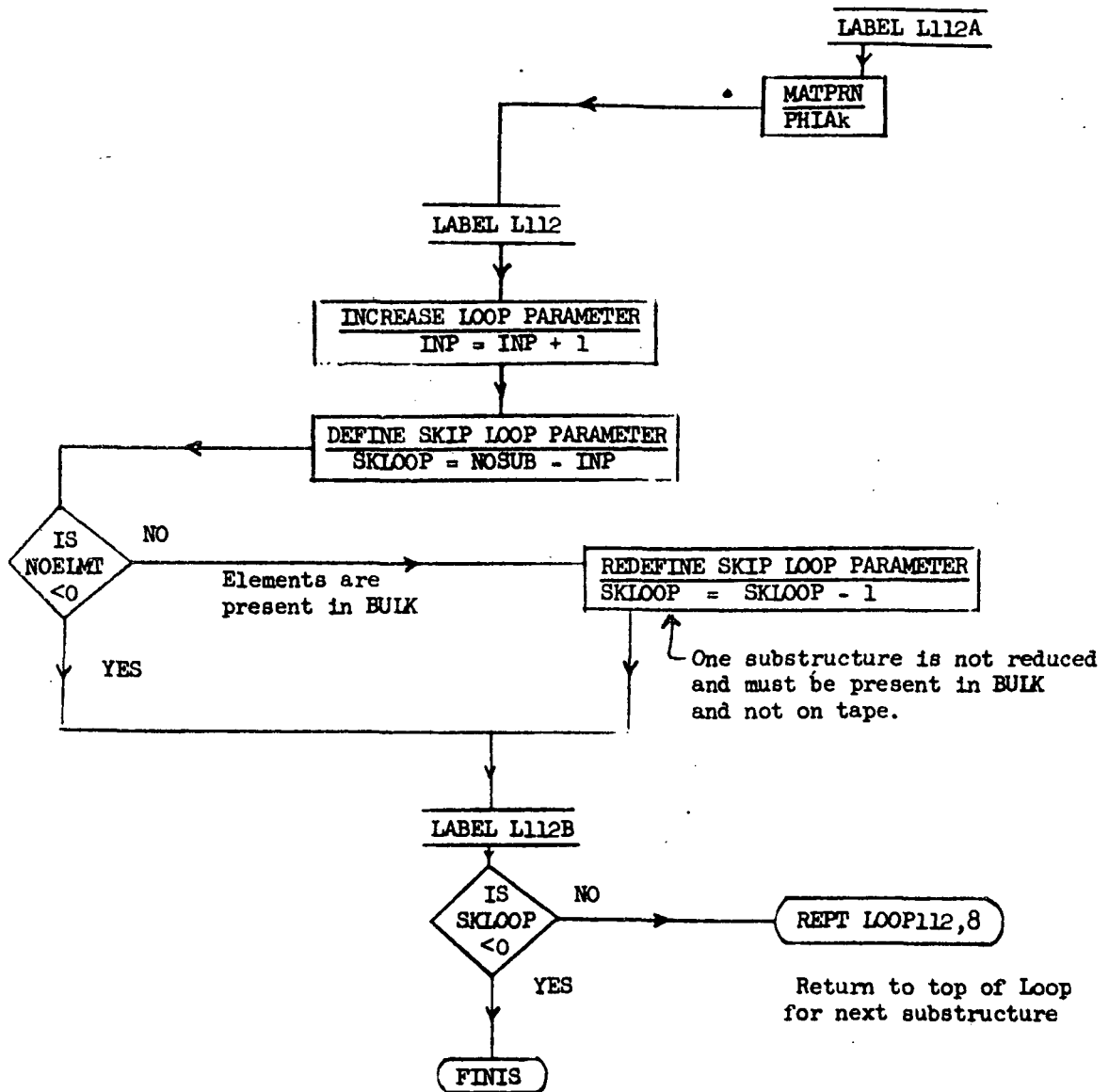


# ALTER 89,89 DETAILED FLOW



# ALTER 112 DETAILED FLOW





**Appendix B2**  
**NASTRAN EXECUTIVE CONTROL DECK**  
**MODEL I ANALYSIS**



# N A S T R A N   E X E C U T I V E   C O N T R O L   D E C K   E C H O

```

10 PHASE2 ORBTAP1
APP      DISP
CHKPNT   YES
SOL       3,0
TIME     29
DIAG     7,8,13,14,19,21,22
ALTER 2  $ PARAMETER DEFAULTS
PARAM    //C,N,NOP/V,Y,NOSUB#1
PARAM    //C,N,NOP/V,Y,TPCOPY#-1
PARAM    //C,N,NOP/V,Y,TPCOPYN#-1
PARAM    //C,N,NOP/V,Y,RMODE#-1
PARAM    //C,N,NOP/V,N,TRUE#-1
$
ALTER 23,23 $ DETERMINES COUPLING PARAMETER & PERFORMS PURGES
PARAM    //C,N,SUB/V,N,COUPLE/V,Y,NOSUB/C,N,2 $
PARAM    //C,N,AND/V,N,NOELMT/V,N,NOELNL/V,N,NOSIMP $
PARAM    //C,N,AND/V,N,NOINP/V,N,NOELMT/V,N,COUPLE $
COND     ER23,NOINP $ WILL EXIT IF NOT A COUPLING RUN & NO ELEMENTS
PURGE    GPST,KGCX/NOSIMP
CHKPNT   GPST,KGCX
COND     L23,COUPLE
PURGE    GGPST/TRUE
JUMP     L24
LABEL    ER23
PRTPARM  //C,N,0/C,N,NOINP $
EXIT
LABEL    L23
$
ALTER 24
LABEL    L24
ALTER 25
COND     L27,NOSIMP
ALTER 27
LABEL    L27
ALTER 29
COND     L29,COUPLE
JUMP     L30
LABEL    L29
ALTER 30
LABEL    L30
$
ALTER 37,37 $ IF COUPLING RUN, COMBINES SUBSTRUCTURES.
$          THE FOLLOWING MATRICES FOR EACH SUBSTRUCT. ASSUMED ON INP9
$          CPGI # COLUMN PARTITIONING VECTOR FOR MERGING KI & MI
$          KI & MI # REDUCED STIFFNESS & MASS
PURGE    CPGI,KI,MI,KCGI,MGGI,KGGS,MGGS,KGT,MGT/COUPLE
COND     L37D,COUPLE $ SKIP, NOT A COUPLING RUN
INPUTT1  /,,,/C,N,-3/C,N,9/V,Y,TPNAME9 $ LIST TAPE & REWIND
PARAM    //C,N,NOP/V,N,PASS#1 $ INITIAL LOOP PASS PARAMETER

```

# N A S T R A N    E X E C U T I V E    C O N T R O L    D E C K    E C H O

```

JUMP      LOOP37
LABEL     LOOP37 $ TOP OF LOOP
PARAM     //C,N,SUB/V,N,PASS1/V,N,PASS/C,N,2
INPUT11   /CPGI,KI,M1,,/C,N,0/C,N,4
COND      L37,PASS1 $ SKIP TO L37 IF FIRST PASS
JUMP      L37A
LABEL     L37
MERGE     ...KI,CPGI,/KGG/C,N,-1/C,N,2/C,N,6
MERGE     ...M1,CPGI,/MGG/C,N,-1/C,N,2/C,N,6
LABEL     L37A
COND      L37B,PASS1 $ SKIP TO L37B IF FIRST PASS
MERGE     ...KI,CPGI,/KGG1/C,N,-1/C,N,2/C,N,6
MERGE     ...M1,CPGI,/MGG1/C,N,-1/C,N,2/C,N,6
ADD       KGG5,KGG1/KGI $
EQUIV     KGT,KGG5/TRUEL
ADD       MGG5,MGG1/MGT $
EQUIV     MGT,MGG5/TRUEL
LABEL     L37B
PARAM     //C,N,ADD/V,N,PASS/V,N,PASS/C,N,1
PARAM     //C,N,SUB/V,N,S,1P2/V,N,NDSUB/V,N,PASS
COND      L37C,NDELMT
PARAM     //C,N,SUB/V,N,SKIP2/V,N,SKIP2/C,N,1
LABEL     L37C
COND      L37D,SKIP2
REPT      LOOP37,2
LABEL     L37D
CHKPNT    KGG5,MGG5
ADD       KGGX,KGG5/KGGY $
ADD       MGG,MGG5/MGGY $
CHKPNT    KGGY,MGGY
EQUIV     KGGY,KGG/NUGENL $
$
ALTER     40,40
SMA3      GF1,KGGY/KGG/V,N,LUSE1/V,N,NUGENL/V,N,NDSIMP
ALTER     48,48
ADD       MGG,/MGG/C,Y,ALPHA4%386.4,0.0H $
MATGPR    GPL,USE1,SIL,KGG//C,N,G
EQUIV     KGG,KNN/MPCF1/MGGY,MNN/MPCF1
ALTER     49
COND      L49,COUPLE
JUMP      L4L4
LABEL     L49
ALTER     58,58
MCE2      USE1,GM,KGG,MGGY,,/KNN,MNN,, $
ALTER     74
SEEMAT    KAA,MAA,,,//C,N,PRINT
$
ALTER     84
PURGE     CPARL,CPFDA,CPNSF,CPGMH,EOP,EOL,EOA,EOB,EOP,EON,EOM,EOG/REACT
PURGE     FX,EXT,EGMT,EGHT,EGGT,EGTC,MGGC,MGGY/REACT

```

# N A S I P A     E X E C U T I V E     C O N T R O L     D E C K     E C H O

```

COND      L84F,RFACF $ R-SFT MUST BE DEFINED TO GENERATE EOG
PURGE     CPFOA/UMIT/CPNSF/SINGLE/CPGMN/MPCF1
VEC       USET/CPARL/C,N,A/C,N,R/C,N,L $
COND      LCP1,OMIT
VEC       USET/CPFOA/C,N,F/C,N,D/C,N,A $
LABEL     LCP1
COND      LCP2,SINGLE
VEC       USET/CPNSF/C,N,N/C,N,S/C,N,F $
LABEL     LCP2
COND      LCP3,MPCF1
VEC       USET/CPGMN/C,N,G/C,N,M/C,N,W $
LABEL     LCP3
CHKPNT    CPFOA,CPNSF,CPGMN,CPARL
PURGE     EOG/UMIT/EGM/MPCF1
TRNSP     DM/DMT
MPYAD     EQR,DMT,/FOL/C,N,8/C,N,1/C,N,0
MERGE     EQR,,EGL,,CPARL,/FGA/C,N,1/C,N,2/C,N,2
EQUIV     EOA,EOF/DMT
COND      L84A,UMIT
TRNSP     GO/GOT
MPYAD     EOA,GOT,/EGG/C,N,0/C,N,1/C,N,0
MERGE     EOA,,EOA,,CPFOA,/LOF/C,N,1/C,N,2/C,N,2
LABEL     L84A
EQUIV     LOF,EQN/SINGLE
COND      L84B,SINGLE
MERGE     ..EQF,,CPNSF,/EQN/C,N,1/C,N,2/C,N,2
LABEL     L84B
EQUIV     EQN,EOG/MPCF1
COND      L84C,MPCF1
TRNSP     GM/GMT
MPYAD     EQN,GMT,/EQM/C,N,0/C,N,1/C,N,0
MERGE     EQM,,EQN,,CPGMN,/FOG/C,N,1/C,N,2/C,N,2
LABEL     L84C
CHKPNT    FOL,EOA,EOG,EOF,EQN,EQM,LOG
TRNSP     EQR/EORT
MATGPR    GPL,USET,SIL,EORT//C,N,R
MPYAD     KLR,DM,KRR/X/C,N,1 $
MATGPR    GPL,USET,SIL,X//C,N,R
MPYAD     EQR,X,/EX/C,N,0/C,N,1/C,N,0 $
TRNSP     EX/EXT
MATGPR    GPL,USET,SIL,EXT//C,N,R
COND      L84D,MPCF1
TRNSP     EQM/EQNT
MATGPR    GPL,USET,SIL,EQNT//C,N,M
LABEL     L84D
TRNSP     EQN/EQNT
MATGPR    GPL,USET,SIL,EQNT//C,N,N
TRNSP     EGG/EGGT
ADD       EGGT,/EGGTC/C,Y,ALPHA#386.4,0.0R $
$ ASSUME CONVERSION OF MASS TO LHS # 386.4

```

N A S T R A N    E X E C U T I V E    C O N T R O L    D E C K    E C H O

```

SMPYAD    ERG,MGG,EGGTC,.../MGGC/C,N,3/C,N,1/C,N,0 $
SMPYAD    EGG,MGGY,EGGTC,.../MGGY/C,N,3/C,N,1/C,N,0 $
MATPRN    MGGG,MGGY,...// $
LABEL    L84F
COND    L84G,TPCOPY
OUTPUT1   KAA,MAA,...//C,N,-1/C,N,0/V,Y,TPNAME
LABEL    L84G
ALTER 89,89
PURGE    KJJ,KCJ,KJC,KCC,MJJ,M CJ,MJC,MCC,PHIJ,MJ,DEIGSJ,PHIJA/RMODE
COND    L89,RMODE $ IF - FREE-FREE MODES WILL BE OBTAINED
$ IF RESTRAINED MODES ARE TO BE OBTAINED CPAJC MUST INPUT
PARTN    KAA,CPAJC,/KJJ,KCJ,KJC,KCC/C,N,-1/C,N,2/C,N,6/C,N,2/C,N,6
PARTN    MAA,CPAJC,/MJJ,M CJ,MJC,MCC/C,N,-1/C,N,2/C,N,6/C,N,2/C,N,6
READ    KJJ,MJJ,...FED,...CASECC/LAMJ,PHIJ,MJ,DEIGSJ/C,N,MODES/V,N,NEIGV $
SAVE    NEIGV
EQUIV    LAMJ,LAMA/TRUE
CHKPNT    LAMJ,PHIJ,MJ,DEIGSJ
DFP    LAMJ,DEIGSJ,...//V,N,CARDNO
SAVE    CARDNO
MERGE    PHIJ,...,CPAJC/PHIJA/C,N,1/C,N,2/C,N,2
EQUIV    PHIJA,PHIA/TRUE
CHKPNT    PHIJA,PHIA,LAMA
JUMP    L93
LABEL    L89
COND    FINIS,REACT
READ    KAA,MAA,MM,DM,FED,USLT,CASECC/LAMA,PHIA,MM,DEIGS/C,N,MODES/V,N,
NEIGV $
ALTER 91,91
CHKPNT    LAMA,PHIA,MM,DEIGS $
ALTER 93
LABEL    L93
$
ALTER 112
PURGE    CPGK,KK,MK,PHIAK/COUPLE
COND    FINIS,COUPLE
INPUTT1   /,.../C,N,-1/C,N,9/V,Y,TPNAME9 $ REWIND INP9
PARAM    //C,N,NOP/V,N,INP#1 $
JUMP    LOOP112
LABEL    LOOP112
INPUTT1   /CPGK,KK,MK,.../C,N,0/C,N,9 $
PARTN    PHIG,,CPGK/,PHIAK,.../C,N,1 $
COND    L112A,TPCOPYN
OUTPUT1   LAMA,PHIAK,... //C,N,-1/V,N,INP/V,Y,TPNAMEN
JUMP    L112
LABEL    L112A
MATPRN    PHIAK,...// $
LABEL    L112
PARAM    //C,N,ADD/V,N,INP/V,N,INP/C,N,1 $
PARAM    //C,N,SUB/V,N,SKLOOP/V,Y,NOSUB/V,N,INP
COND    L112B,NOL L4T

```

N A S T R A N   E X E C U T I V E   C O N T R O L   D E C K   E C H O

PARAM    //C.N.SUB/V.N.SKLOOP/V.N.SKLOOP/C.N.1  
LABEL    L1123  
COND    FINIS.SKLOOP  
REPT    LOOP112,8  
ENDALTER  
CEND

**Appendix B3**  
**SORTED BULK DATA — SYMMETRIC AND ANTISYMMETRIC MODES**  
**PHASE 1 ANALYSIS: MODEL I FUSELAGE**

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

C A S E   C O N T R O L   D E C K   E C H O

CARD  
COUNT

1	TITLE = PHASE 1(SYM.CASE)
2	SUBTITLE = ORIGINAL FUSELAGE
3	MPC = 401
4	SPC = 301
5	METHCD = 1
6	BEGIN BULK

PHASE 1(SYN+CASE)  
ORIGINAL FUSELAGE

S C R T E D B U L K D A T A E C H O										
CARD	1	2	3	4	5	6	7	8	9	10
CDUNT	..	..	..	..	..	..	..	..	..	..
1-	ASE T1	1	1800							
2-	ASE T1	1	1926							
3-	ASE T1	3	241	506	1701	1833	1801	1724		
4-	ASE T1	3	918	919	1018	1019	1315	1316		
5-	ASE T1	3	1413	1414	1505	1506	1613	1614		
6-	ASE T1	12	1515	1655						
7-	ASE T1	13	101	201	301	501	601	701	801	
8-	ASE T1	13	901	911	1011	1101	1111	1201	1321	
9-	ASE T1	13	1157							
10-	ASE T1	13	1401	1406	1516	1601	1606	1837	2001	
11-	ASE T1	13	2026	2040	2115					
12-	ASE T1	23	229	232	235	238				
13-	ASE T1	23	1823	1827	1831	1835				
14-	ASE T1	123	104	110	120	206	230	305	318	
15-	ASE T1	123	505	518	605	618	705	718	760	
16-	ASE T1	123	805	818	905	923	1105	1115	1123	
17-	ASE T1	123	1155	1305	1161	1205	1212	1220		
18-	ASE T1	123	1312	1405	1410	1418	1502	1605	1610	
19-	ASE T1	123	1618	1656	1705	1710	1718	1806	1812	
20-	ASE T1	123	1824	1838	1905	1918	2005	2014	2030	
21-	ASE T1	123	2041	2114						
22-	ASE T1	123456	2200							
23-	CBAR	181	181	151	152	166			2	
24-	CBAR	182	181	152	153	169			2	
25-	CBAR	183	181	153	154	168			2	
26-	CBAR	184	181	154	155	167			2	
27-	CBAR	185	181	155	156	158			2	
28-	CBAR	186	181	156	157	151			2	
29-	CBAR	187	181	157	158	166			2	
30-	CBAR	188	181	158	159	166			2	
31-	CBAR	189	181	159	160	166			2	
32-	CBAR	190	181	160	161	166			2	
33-	CBAR	191	181	161	162	166			2	
34-	CBAR	192	181	162	163	166			2	
35-	CBAR	193	181	163	164	166			2	
36-	CBAR	194	194	158	167	156			2	
37-	CBAR	195	194	167	168	154			2	
38-	CBAR	196	194	168	169	153			2	
39-	CBAR	197	194	169	166	152			2	
40-	CBAR	198	181	166	165	158			2	
41-	CBAR	199	181	165	151	157			2	
42-	CBAR	463	463	305	310	.0	1.0	.0	1	8463
43-	8463			.0	.575	.0	.0	.575	.0	
44-	CBAR	464	464	310	312	.0	1.0	.0	1	8464
45-	8464			.0	.575	.0	.0	.575	.0	
46-	CBAR	465	465	312	314	.0	1.0	.0	1	8465
47-	8465			.0	.575	.0	.0	.575	.0	
48-	CBAR	466	466	314	316	.0	1.0	.0	1	8466
49-	8466			.0	.575	.0	.0	.575	.0	
50-	CBAR	467	467	316	318	.0	1.0	.0	1	8467



PHASE I (SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O										
CARD	1	2	3	4	5	6	7	8	9	10
COUNT	..	..	..	..	..	..	..	..	..	..
51- 6467				.0	.575	.0	.0	.575	.0	
52- CBAR	761	181	751	752	760				2	
53- CBAR	762	181	752	753	760				2	
54- CBAR	763	181	753	754	760				2	
55- CBAR	764	181	754	755	760				2	
56- CBAR	765	181	755	756	751				2	
57- CBAR	766	181	756	757	751				2	
58- CBAR	767	181	757	758	751				2	
59- CBAR	768	181	758	759	751				2	
60- CBAR	769	181	759	760	751				2	
61- CBAR	1151	181	1162	1151	1157				2	
62- CBAR	1152	181	1151	1152	1161				2	
63- CBAR	1153	181	1152	1153	1161				2	
64- CBAR	1154	181	1153	1154	1161				2	
65- CBAR	1155	181	1154	1155	1161				2	
66- CBAR	1156	181	1155	1156	1162				2	
67- CBAR	1157	181	1156	1157	1162				2	
68- CBAR	1158	181	1157	1158	1162				2	
69- CBAR	1159	181	1158	1159	1162				2	
70- CBAR	1160	181	1159	1160	1162				2	
71- CBAR	1161	181	1160	1161	1162				2	
72- CBAR	1231	181	1221	1206	1212				2	
73- CBAR	1232	181	1206	1201	1210				2	
74- CBAR	1927	1927	1905	1918	.0	1.0	.0	1		61927
75- 61927			.0	.75	.0	.0	.75	.0		
76- CBAR	1928	1928	1918	1919	.0	1.0	.0	1		61928
77- 61928			.0	.75	.0	.0	.75	.0		
78- CBAR	1929	1929	1919	1920	.0	1.0	.0	1		61929
79- 61929			.0	.75	.0	.0	.75	.0		
80- CBAR	1930	1930	1920	1921	.0	1.0	.0	1		61930
81- 61930			.0	.75	.0	.0	.75	.0		
82- CBAR	1931	1931	1921	1922	.0	1.0	.0	1		61931
83- 61931			.0	.75	.0	.0	.75	.0		
84- CBAR	2101	2101	2101	2102	2110			2		
85- CBAR	2102	2102	2102	2103	2110			2		
86- CBAR	2103	2103	2103	2104	2110			2		
87- CBAR	2104	2104	2104	2105	2110			2		
88- CBAR	2105	2105	2105	2106	.0	1.0	.0	1		
89- CBAR	2106	2106	2106	2107	.0	1.0	.0	1		
90- CBAR	2107	2107	2107	2108	.0	1.0	.0	1		
91- CBAR	2108	2108	2108	2109	.0	1.0	.0	1		
92- CBAR	2109	2109	2109	2110	.0	1.0	.0	1		
93- CBAR	2110	2110	2110	2111	.0	1.0	.0	1		
94- CBAR	2111	2111	2111	2112	.0	1.0	.0	1		
95- CBAR	2112	2112	2112	2113	2101			2		
96- CBAR	2113	2113	2113	2114	2101			2		
97- CBAR	2114	2114	2114	2115	2101			2		
98- CBAR	2502	2502	230	318	.0	1.0	.0	1		62502
99- 62502			.0	.875	.0	.0	.875	.0		
100- CBAR	2503	2503	318	518	.0	1.0	.0	1		62503

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

SORTED BULK DATA ECHO										
CARD	1	2	3	4	5	6	7	8	9	10
101- 62503				.0	.875	.0	.0	.875	.0	
102- CBAR	2504	2504	518	618	.0	1.0	.0	1	62504	
103- 62504			.0	.875	.0	.0	.875	.0		
104- CBAR	2505	2505	618	718	.0	1.0	.0	1	62505	
105- 62505			.0	.875	.0	.0	.875	.0		
106- CBAR	2506	2506	718	760	.0	1.0	.0	1	62506	
107- 62506			.0	.875	.0	.0	.875	.0		
108- CBAR	2507	2507	760	818	.0	1.0	.0	1	62507	
109- 62507			.0	.875	.0	.0	.875	.0		
110- CBAR	2508	2508	818	923	.0	1.0	.0	1	62508	
111- 62508			.0	.875	.0	.0	.875	.0		
112- CBAR	2509	2509	923	1023	.0	1.0	.0	1	62509	
113- 62509			.0	.875	.0	.0	.875	.0		
114- CBAR	2510	2510	1023	1123	.0	1.0	.0	1	62510	
115- 62510			.0	.875	.0	.0	.875	.0		
116- CBAR	2511	2511	1123	1161	.0	1.0	.0	1	62511	
117- 62511			.0	.875	.0	.0	.875	.0		
118- CBAR	2512	2512	1161	1220	.0	1.0	.0	1	62512	
119- 62512			.0	.875	.0	.0	.875	.0		
120- CBAR	2513	2513	1220	1320	.0	1.0	.0	1	62513	
121- 62513			.0	.875	.0	.0	.875	.0		
122- CBAR	2514	2514	1320	1418	.0	1.0	.0	1	62514	
123- 62514			.0	.875	.0	.0	.875	.0		
124- CBAR	2515	2515	1418	1510	.0	1.0	.0	1	62515	
125- 62515			.0	.875	.0	.0	.875	.0		
126- CBAR	2516	2516	1510	1618	.0	1.0	.0	1	62516	
127- 62516			.0	.875	.0	.0	.875	.0		
128- CBAR	2517	2517	1618	1660	.0	1.0	.0	1	62517	
129- 62517			.0	.875	.0	.0	.875	.0		
130- CBAR	2518	2518	1660	1718	.0	1.0	.0	1	62518	
131- 62518			.0	.875	.0	.0	.875	.0		
132- CBAR	2519	2519	1718	1824	.0	1.0	.0	1	62519	
133- 62519			.0	.875	.0	.0	.0	.0		
134- CBAR	2713	2713	1824	1922	.0	1.0	.0	1		
135- CBAR	2722	181	1821	1930	1801			2		
136- CBAR	2723	181	1930	1934	1901			2		
137- CBAR	2724	181	1930	1929	1901			2		
138- CBAR	2725	181	1929	1922	1905			2	68M2725	
139- 68M2725		6								
140- CBAR	2726	181	1927	1926	1930			2		
141- CBAR	2727	181	1926	1925	1930			2		
142- CBAR	2728	181	1925	1924	1930			2		
143- CBAR	2729	181	1924	1923	1930			2		
144- CBAR	2730	181	1923	1922	1930			2	68M2730	
145- 68M2730		6								
146- CONM2	400	301	0	.39						
147- CONM2	500	501	0	.14						
148- CONM2	900	919	0	.16						
149- CONM2	1000	1019	0	.16						
150- CONM2	1300	1316	0	.16						

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O										
CARD	1	2	3	4	5	6	7	8	9	10
151- CONM2	1400	1414	0		.16					
152- CONM2	1500	1506	0		.16					
153- CONM2	1600	1614	0		.16					
154- CONM2	1800	1800	0		2.25					
155- CONM2	2000	2200	0		26.15					
156- EQHMS	44.4		232.2				219.5			EQHMS
157- CONM2	2031	2011	0		.13					
158- CONM2	2032	2014	0		.33					
159- CONM2	2033	2026	0		.22					
160- CONM2	2034	2029	0		.12					
161- CONROD	101	101	102	1		.023000			.014	
162- CONROD	102	102	103	1		.023000			.014	
163- CONROD	103	103	104	1		.023000			.014	
164- CONROD	104	104	105	1		.023000			.014	
165- CONROD	105	105	110	1		.023000			.014	
166- CONROD	109	111	112	1		.072000			.790	
167- CONROD	110	112	113	1		.072000			.790	
168- CONROD	111	113	114	1		.072000			.790	
169- CONROD	112	114	115	1		.072000			.790	
170- CONROD	113	116	117	1		.154000				
171- CONROD	114	117	118	1		.154000				
172- CONROD	115	118	119	1		.154000				
173- CONROD	116	119	120	1		.154000				
174- CONROD	122	128	129	1		.040000				
175- CONROD	123	130	131	1		.020000				
176- CONROD	124	101	106	11		.056000				
177- CONROD	129	106	111	11		.056000				
178- CONROD	133	110	115	11		.023000				
179- CONROD	138	115	120	11		.023000				
180- CONROD	143	120	125	11		.023				
181- CONROD	146	125	127	11		.023000			.0200	
182- CONROD	147	126	128	1		.016000				
183- CONROD	148	127	129	1		.039400			.0100	
184- CONROD	149	128	130	1		.009300				
185- CONROD	150	129	131	1		.033000			.0080	
186- CONROD	201	201	202	1		.059200			.0233	
187- CONROD	202	202	203	1		.059200			.0233	
188- CONROD	203	203	204	1		.059200			.0233	
189- CONROD	204	204	205	1		.059200			.0233	
190- CONROD	205	205	206	1		.059200			.0233	
191- CONROD	216	219	220	1		.095000			.0174	
192- CONROD	217	220	221	1		.095000			.0174	
193- CONROD	218	221	222	1		.095000			.0174	
194- CONROD	219	222	223	1		.095000			.0174	
195- CONROD	220	223	224	1		.095000			.0174	
196- CONROD	223	228	229	1		.040000				
197- CONROD	224	229	230	1		.040000				
198- CONROD	225	231	232	1		.040000				
199- CONROD	226	232	233	1		.040000				
200- CONROD	227	234	235	1		.040000				

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S C R T E D B U L K D A T A E C H O										
CARD	1	2	3	4	5	6	7	8	9	10
201- CONROD	228	235	236	1		.040000				
202- CONROD	229	237	238	1		.040000				
203- CONROD	230	238	239	1		.040000				
204- CONROD	231	240	241	1		.040000				
205- CONROD	232	241	242	1		.040000				
206- CONROD	233	201	207	11		.050000				
207- CONROD	238	206	212	11		.050000				
208- CONROD	239	207	213	11		.050000				
209- CONROD	244	212	218	11		.050000				
210- CONROD	245	213	219	11		.050000				
211- CONROD	250	218	224	11		.050000				
212- CONROD	254	224	227	11		.050000			.0200	
213- CONROD	255	225	228	1		.030000				
214- CONROD	256	226	229	1		.020000				
215- CONROD	257	227	230	1		.030000			.0200	
216- CONROD	258	228	231	1		.030000				
217- CONROD	259	229	232	1		.020000				
218- CONROD	260	230	233	1		.047500			.0100	
219- CONROD	261	231	234	1		.030000				
220- CONROD	262	232	235	1		.020000				
221- CONROD	263	233	236	1		.047500			.0100	
222- CONROD	264	234	237	1		.030000				
223- CONROD	265	235	238	1		.020000				
224- CONROD	266	236	239	1		.047500			.0100	
225- CONROD	267	237	240	1		.030000				
226- CONROD	268	238	241	1		.020000				
227- CONROD	269	239	242	1		.047500			.0100	
228- CONROD	301	301	302	1		.172000			.0000	
229- CONROD	302	302	303	1		.172000			.0000	
230- CONROD	303	303	304	1		.172000			.0000	
231- CONROD	304	304	305	1		.172000			.0000	
232- CONROD	305	306	307	1		.172000			.0710	
233- CONROD	306	307	308	1		.172000				
234- CONROD	307	308	309	1		.172000				
235- CONROD	308	309	310	1		.172000				
236- CONROD	309	311	312	1		.091000				
237- CONROD	310	313	314	1		.091				
238- CONROD	311	315	316	1		.091				
239- CONROD	312	317	318	1		.032000				
240- CONROD	313	301	306	1		.062500				
241- CONROD	314	302	307	1		.125000				
242- CONROD	315	303	308	1		.125000				
243- CONROD	316	304	309	1		.125				
244- CONROD	317	305	310	1		.129000			.0610	
245- CONROD	318	309	311	1		.115				
246- CONROD	319	310	312	1		.115000			.0494	
247- CONROD	320	311	313	1		.104000				
248- CONROD	321	312	314	1		.104000			.0430	
249- CONROD	322	313	315	1		.092				
250- CONROD	323	314	316	1		.092000			.0363	

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O											
CARD	COUNT	1	2	3	4	5	6	7	8	9	10
251-	CONROD	324	315	317	1		.078				
252-	CONROD	325	316	318	1		.078000			.0285	
253-	CONROD	451	406	407	1		.172000				
254-	CONROD	452	407	408	1		.172000				
255-	CONROD	453	408	409	1		.172000				
256-	CONROD	454	409	310	1		.172000				
257-	CONROD	455	301	302	1		.172000			.0687	
258-	CONROD	456	302	303	1		.172000			.0687	
259-	CONROD	457	303	304	1		.172000			.0687	
260-	CONROD	458	304	305	1		.172000			.0687	
261-	CONROD	459	301	406	1		.062500				
262-	CONROD	460	302	407	1		.125000				
263-	CONROD	461	303	408	1		.125000				
264-	CONROD	462	304	409	1		.125000				
265-	CONROD	501	501	502	1		.172000			.0513	
266-	CONROD	502	502	503	1		.172000			.0687	
267-	CONROD	503	503	504	1		.172000			.0687	
268-	CONROD	504	504	505	1		.172000			.0618	
269-	CONROD	505	506	507	1		.172000				
270-	CONROD	506	507	508	1		.172000				
271-	CONROD	507	508	509	1		.172000				
272-	CONROD	508	509	510	1		.172000				
273-	CONROD	509	511	512	1		.091000				
274-	CONROD	510	513	514	1		.091000				
275-	CONROD	511	515	516	1		.091000				
276-	CONROD	512	517	518	1		.032000				
277-	CONROD	513	501	506	1		.100000				
278-	CONROD	514	502	507	1		.125000				
279-	CONROD	515	503	508	1		.125000				
280-	CONROD	516	504	509	1		.129000				
281-	CONROD	517	505	510	1		.129000			.0618	
282-	CONROD	518	509	511	1		.115000				
283-	CONROD	519	510	512	1		.115000			.0454	
284-	CONROD	520	511	513	1		.104000				
285-	CONROD	521	512	514	1		.104000			.0430	
286-	CONROD	522	513	515	1		.092000				
287-	CONROD	523	514	516	1		.092000			.0363	
288-	CONROD	524	515	517	1		.078000				
289-	CONROD	525	516	518	1		.078000			.0285	
290-	CONROD	602	602	603	1		.172000			.1140	
291-	CONROD	603	603	604	1		.172000			.0687	
292-	CONROD	604	604	605	1		.172000			.0618	
293-	CONROD	605	606	607	1		.172000				
294-	CONROD	606	607	608	1		.172000				
295-	CONROD	607	608	609	1		.172000				
296-	CONROD	608	609	610	1		.172000				
297-	CONROD	609	611	612	1		.091000				
298-	CONROD	610	613	614	1		.091000				
299-	CONROD	611	615	616	1		.091000				
300-	CONROD	612	617	618	1		.032000				

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   C A T A   E C H O										
CARD COUNT	1	2	3	4	5	6	7	8	9	10
301-	CONROD	613	601	606	1	.062500				
302-	CONROD	614	602	607	1	.125000				
303-	CONROD	615	603	608	1	.125000				
304-	CONROD	616	604	609	1	.125000				
305-	CONROD	617	605	610	1	.125000				
306-	CONROD	618	609	611	1	.115000			.0618	
307-	CONROD	619	610	612	1	.115000			.0454	
308-	CONROD	620	611	613	1	.104000				
309-	CONROD	621	612	614	1	.104000			.0430	
310-	CONROD	622	613	615	1	.092000				
311-	CONROD	623	614	616	1	.092000			.0363	
312-	CONROD	624	615	617	1	.078000				
313-	CONROD	625	616	618	1	.078000			.0285	
314-	CONROD	702	702	703	1	.172000			.1140	
315-	CONROD	703	703	704	1	.172000			.0687	
316-	CONROD	704	704	705	1	.172000			.0618	
317-	CONROD	705	706	707	1	.172000				
318-	CONROD	706	707	708	1	.172000				
319-	CONROD	707	708	709	1	.172000				
320-	CONROD	708	709	710	1	.172000				
321-	CONROD	709	711	712	1	.091000				
322-	CONROD	710	713	714	1	.091000				
323-	CONROD	711	715	716	1	.091000				
324-	CONROD	712	717	718	1	.032000				
325-	CONROD	713	701	706	1	.062500				
326-	CONROD	714	702	707	1	.125000				
327-	CONROD	715	703	708	1	.125000				
328-	CONROD	716	704	709	1	.125000				
329-	CONROD	717	705	710	1	.125000			.0618	
330-	CONROD	718	709	711	1	.116000				
331-	CONROD	719	710	712	1	.116000			.0501	
332-	CONROD	720	711	713	1	.104000				
333-	CONROD	721	712	714	1	.104000			.0430	
334-	CONROD	722	713	715	1	.092000				
335-	CONROD	723	714	716	1	.092000			.0363	
336-	CONROD	724	715	717	1	.078000				
337-	CONROD	725	716	718	1	.078000			.0285	
338-	CONROD	802	802	803	1	.172000			.1140	
339-	CONROD	803	803	804	1	.172000			.0687	
340-	CONROD	804	804	805	1	.172000			.0618	
341-	CONROD	805	806	807	1	.172000				
342-	CONROD	806	807	808	1	.172000				
343-	CONROD	807	808	809	1	.172000				
344-	CONROD	808	809	810	1	.172000				
345-	CONROD	809	811	812	1	.090000				
346-	CONROD	810	813	814	1	.090000				
347-	CONROD	811	815	816	1	.090000				
348-	CONROD	812	817	818	1	.032000				
349-	CONROD	813	801	806	1	.062500				
350-	CONROD	814	802	807	1	.125000				

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   C A T A   E C H O											
CARD	COUNT	1	2	3	4	5	6	7	8	9	10
351-	CONROD	815	803	808	1		.125000				
352-	CONROD	816	804	809	1		.129000				
353-	CONROD	817	805	810	1		.129000			.0618	
354-	CONROD	818	809	811	1		.116000				
355-	CONROD	819	810	812	1		.116000			.0501	
356-	CONROD	820	811	813	1		.104000				
357-	CONROD	821	812	814	1		.104000			.0430	
358-	CONROD	822	813	815	1		.092000				
359-	CONROD	823	814	816	1		.092000			.0363	
360-	CONROD	824	815	817	1		.078000				
361-	CONROD	825	816	818	1		.078000			.0255	
362-	CONROD	902	902	903	1		.056000			.0428	
363-	CONROD	903	903	904	1		.056000			.0259	
364-	CONROD	904	904	905	1		.056000			.0438	
365-	CONROD	909	911	912	1		.012000				
366-	CONROD	910	912	913	1		.056000				
367-	CONROD	911	913	914	1		.056000				
368-	CONROD	912	914	915	1		.056000				
369-	CONROD	913	916	917	1		.090000				
370-	CONROD	914	918	919	1		.090000				
371-	CONROD	915	920	921	1		.090000				
372-	CONROD	916	922	923	1		.032000				
373-	CONROD	917	901	911	11		.109000				
374-	CONROD	918	902	912	1		.040000				
375-	CONROD	919	903	913	1		.040000				
376-	CONROD	920	904	914	1		.132000				
377-	CONROD	921	905	910	1		.135000			.0438	
378-	CONROD	922	910	915	1		.123000			.0438	
379-	CONROD	927	914	916	1		.115000				
380-	CONROD	928	915	917	1		.115000			.0493	
381-	CONROD	929	916	918	1		.102000				
382-	CONROD	930	917	919	1		.102000			.0427	
383-	CONROD	931	918	920	1		.092000				
384-	CONROD	932	919	921	1		.092000			.0363	
385-	CONROD	933	920	922	1		.080000				
386-	CONROD	934	921	923	1		.080000			.0292	
387-	CONROD	1002	1002	1003	1		.058000			.0439	
388-	CONROD	1003	1003	1004	1		.058000			.0265	
389-	CONROD	1004	1004	1005	1		.058000			.0436	
390-	CONROD	1005	1011	1012	1		.012000				
391-	CONROD	1006	1012	1013	1		.058000				
392-	CONROD	1007	1013	1014	1		.058000				
393-	CONROD	1008	1014	1015	1		.058000				
394-	CONROD	1009	1016	1017	1		.090000				
395-	CONROD	1010	1018	1019	1		.090000				
396-	CONROD	1011	1020	1021	1		.090000				
397-	CONROD	1012	1022	1023	1		.032000				
398-	CONROD	1013	1001	1011	11		.109000				
399-	CONROD	1014	1002	1012	1		.040000				
400-	CONROD	1015	1003	1013	1		.040000				

PHASE I(SYM.CASE)  
ORIGINAL FUSELAGE

SORTED BULK DATA ECHO											
CARD	COUNT	1	2	3	4	5	6	7	8	9	10
401-	CONROD	1016	1004	1014	1		.132000				
402-	CONROD	1017	1005	1010	1		.135000			.0436	
403-	CONROD	1018	1010	1015	1		.123000			.0436	
404-	CONROD	1027	1014	1016	1		.115000				
405-	CONROD	1028	1015	1017	1		.115000			.0493	
406-	CONROD	1029	1016	1018	1		.103000				
407-	CONROD	1030	1017	1019	1		.103000			.0427	
408-	CONROD	1031	1018	1020	1		.092000				
409-	CONROD	1032	1019	1021	1		.092000			.0363	
410-	CONROD	1033	1020	1022	1		.080000				
411-	CONROD	1034	1021	1023	1		.080000			.0252	
412-	CONROD	1102	1102	1103	1		.060000			.0462	
413-	CONROD	1103	1103	1104	1		.060000			.0272	
414-	CONROD	1104	1104	1105	1		.060000			.0452	
415-	CONROD	1105	1111	1112	1		.012000				
416-	CONROD	1106	1112	1113	1		.060000				
417-	CONROD	1107	1113	1114	1		.060000				
418-	CONROD	1108	1114	1115	1		.060000				
419-	CONROD	1109	1116	1117	1		.090000				
420-	CONROD	1110	1118	1119	1		.090000				
421-	CONROD	1111	1120	1121	1		.090000				
422-	CONROD	1112	1122	1123	1		.032000				
423-	CONROD	1114	1101	1111	11		.109000				
424-	CONROD	1115	1102	1112	1		.040000				
425-	CONROD	1116	1103	1113	1		.040000				
426-	CONROD	1117	1104	1114	1		.135000				
427-	CONROD	1119	1105	1110	1		.135000			.0452	
428-	CONROD	1120	1110	1115	1		.123000			.0452	
429-	CONROD	1121	1114	1116	1		.115000				
430-	CONROD	1122	1115	1117	1		.115000			.0493	
431-	CONROD	1123	1116	1118	1		.103000				
432-	CONROD	1124	1117	1119	1		.103000			.0427	
433-	CONROD	1125	1118	1120	1		.092000				
434-	CONROD	1126	1119	1121	1		.092000			.0363	
435-	CONROD	1127	1120	1122	1		.080000				
436-	CONROD	1128	1121	1123	1		.080000			.0252	
437-	CONROD	1129	1151	1162	1		.010				
438-	CONROD	1202	1202	1203	1		.172000			.1140	
439-	CONROD	1203	1203	1204	1		.172000			.0687	
440-	CONROD	1204	1204	1205	1		.172000			.0618	
441-	CONROD	1205	1206	1207	1		.060				
442-	CONROD	1206	1207	1208	1		.172000				
443-	CONROD	1207	1208	1209	1		.172000				
444-	CONROD	1208	1209	1210	1		.172000				
445-	CONROD	1209	1211	1212	1		.090000				
446-	CONROD	1210	1213	1214	1		.090000				
447-	CONROD	1211	1215	1216	1		.090000				
448-	CONROD	1212	1217	1218	1		.090000				
449-	CONROD	1213	1219	1220	1		.032000				
450-	CONROD	1214	1201	1206	11		.109000				



PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O											
CARD	COUNT	1	2	3	4	5	6	7	8	9	10
451-	CONROD	1215	1202	1207	1		.125000				
452-	CONROD	1216	1203	1208	1		.125000				
453-	CONROD	1217	1204	1209	1		.135000				
454-	CONROD	1218	1205	1210	1		.135000			.0618	
455-	CONROD	1219	1209	1211	1		.123000				
456-	CONROD	1220	1210	1212	1		.123000			.0550	
457-	CONROD	1221	1211	1213	1		.115000				
458-	CONROD	1222	1212	1214	1		.115000			.0493	
459-	CONROD	1223	1213	1215	1		.103000				
460-	CONROD	1224	1214	1216	1		.103000			.0427	
461-	CONROD	1225	1215	1217	1		.092000				
462-	CONROD	1226	1216	1218	1		.092000			.0363	
463-	CONROD	1227	1217	1219	1		.080000				
464-	CONROD	1228	1218	1220	1		.080000			.0292	
465-	CONROD	1229	1206	1221	11		.109				
466-	CONROD	1302	1302	1303	1		.172000			.1140	
467-	CONROD	1303	1303	1304	1		.172000			.0667	
468-	CONROD	1304	1304	1305	1		.172000			.0618	
469-	CONROD	1305	1306	1307	1		.060000				
470-	CONROD	1306	1307	1308	1		.172000				
471-	CONROD	1307	1308	1309	1		.172000				
472-	CONROD	1308	1309	1310	1		.172000				
473-	CONROD	1309	1311	1312	1		.090000				
474-	CONROD	1310	1313	1314	1		.090000				
475-	CONROD	1311	1315	1316	1		.090000				
476-	CONROD	1312	1317	1318	1		.090000				
477-	CONROD	1313	1319	1320	1		.032000				
478-	CONROD	1314	1301	1306	11		.109000				
479-	CONROD	1315	1302	1307	1		.125000				
480-	CONROD	1316	1303	1308	1		.125000				
481-	CONROD	1317	1304	1309	1		.135000				
482-	CONROD	1318	1305	1310	1		.135000			.0618	
483-	CONROD	1319	1309	1311	1		.123000				
484-	CONROD	1320	1310	1312	1		.123000			.0550	
485-	CONROD	1321	1311	1313	1		.115000				
486-	CONROD	1322	1312	1314	1		.115000			.0493	
487-	CONROD	1323	1313	1315	1		.103000				
488-	CONROD	1324	1314	1316	1		.103000			.0427	
489-	CONROD	1325	1315	1317	1		.092000				
490-	CONROD	1326	1316	1318	1		.092000			.0363	
491-	CONROD	1327	1317	1319	1		.080000				
492-	CONROD	1328	1318	1320	1		.080000			.0292	
493-	CONROD	1329	1306	1321	11		.109				
494-	CONROD	1402	1402	1403	1		.060000			.0231	
495-	CONROD	1403	1403	1404	1		.060000			.0139	
496-	CONROD	1404	1404	1405	1		.060000			.0304	
497-	CONROD	1405	1407	1408	1		.060000			.0231	
498-	CONROD	1406	1408	1409	1		.060000			.0139	
499-	CONROD	1407	1409	1410	1		.060000			.0304	
500-	CONROD	1408	1411	1412	1		.090000				

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

SORTED BULK DATA ECHO											
CARD	COUNT	1	2	3	4	5	6	7	8	9	10
501-	CONROD	1409	1413	1414	1		.090000				
502-	CONROD	1410	1415	1416	1		.090000				
503-	CONROD	1411	1417	1418	1		.032000				
504-	CONROD	1412	1401	1406	11		.109000				
505-	CONROD	1413	1402	1407	1		.040000				
506-	CONROD	1414	1403	1408	1		.040000				
507-	CONROD	1415	1404	1409	1		.132000				
508-	CONROD	1416	1405	1410	1		.132000			.0304	
509-	CONROD	1417	1409	1411	1		.115000				
510-	CONROD	1418	1410	1412	1		.115000			.0493	
511-	CONROD	1419	1411	1413	1		.103000				
512-	CONROD	1420	1412	1414	1		.103000			.0427	
513-	CONROD	1421	1413	1415	1		.092000				
514-	CONROD	1422	1414	1416	1		.092000			.0363	
515-	CONROD	1423	1415	1417	1		.080000				
516-	CONROD	1424	1416	1418	1		.080000			.0292	
517-	CONROD	1501	1501	1502	1		.140000				
518-	CONROD	1502	1503	1504	1		.091000				
519-	CONROD	1503	1505	1506	1		.091000				
520-	CONROD	1504	1507	1508	1		.091000				
521-	CONROD	1505	1509	1510	1		.032000				
522-	CONROD	1506	1501	1503	1		.115000				
523-	CONROD	1507	1502	1504	1		.115000			.0493	
524-	CONROD	1508	1503	1505	1		.103000				
525-	CONROD	1509	1504	1506	1		.103000			.0427	
526-	CONROD	1510	1505	1507	1		.092000				
527-	CONROD	1511	1506	1508	1		.092000			.0363	
528-	CONROD	1512	1507	1509	1		.080000				
529-	CONROD	1513	1508	1510	1		.080000			.0292	
530-	CONROD	1602	1602	1603	1		.060000			.0231	
531-	CONROD	1603	1603	1604	1		.060000			.0139	
532-	CONROD	1604	1604	1605	1		.060000			.0304	
533-	CONROD	1606	1607	1608	1		.060000			.0231	
534-	CONROD	1607	1608	1609	1		.060000			.0139	
535-	CONROD	1608	1609	1610	1		.060000			.0304	
536-	CONROD	1609	1611	1612	1		.091000				
537-	CONROD	1610	1613	1614	1		.091000				
538-	CONROD	1611	1615	1616	1		.091000				
539-	CONROD	1612	1617	1618	1		.032000				
540-	CONROD	1613	1601	1606	11		.109000				
541-	CONROD	1614	1602	1607	1		.040000				
542-	CONROD	1615	1603	1608	1		.040000				
543-	CONROD	1616	1604	1609	1		.132000				
544-	CONROD	1617	1605	1610	1		.132000			.0304	
545-	CONROD	1618	1609	1611	1		.115000				
546-	CONROD	1619	1610	1612	1		.115000			.0493	
547-	CONROD	1620	1611	1613	1		.103000				
548-	CONROD	1621	1612	1614	1		.103000			.0427	
549-	CONROD	1622	1613	1615	1		.092000				
550-	CONROD	1623	1614	1616	1		.092000			.0363	

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D B U L K D A T A E C H O										
CARD	1	2	3	4	5	6	7	8	9	10
551- CONROD	1624	1615	1617	1		.080000				
552- CONROD	1625	1616	1618	1		.080000			.0292	
553- CONROD	1626	1651	1661	1		.010				
554- CONROD	1702	1702	1703	1		.060000			.0231	
555- CONROD	1703	1703	1704	1		.060000			.0139	
556- CONROD	1704	1704	1705	1		.060000			.0304	
557- CONROD	1705	1706	1707	1		.060000			.0139	
558- CONROD	1706	1707	1708	1		.060000			.0139	
559- CONROD	1707	1708	1709	1		.060000			.0139	
560- CONROD	1708	1709	1710	1		.060000			.0304	
561- CONROD	1709	1711	1712	1		.091000				
562- CONROD	1710	1713	1714	1		.091000				
563- CONROD	1711	1715	1716	1		.091000				
564- CONROD	1712	1717	1718	1		.032000				
565- CONROD	1713	1701	1706	11		.100000				
566- CONROD	1714	1702	1707	1		.040000				
567- CONROD	1715	1703	1708	1		.040000				
568- CONROD	1716	1704	1709	1		.132000				
569- CONROD	1717	1705	1710	1		.132000			.0304	
570- CONROD	1718	1709	1711	1		.115000				
571- CONROD	1719	1710	1712	1		.115000			.0493	
572- CONROD	1720	1711	1713	1		.103000				
573- CONROD	1721	1712	1714	1		.103000			.0427	
574- CONROD	1722	1713	1715	1		.092000				
575- CONROD	1723	1714	1716	1		.092000			.0363	
576- CONROD	1724	1715	1717	1		.080000				
577- CONROD	1725	1716	1718	1		.080000			.0292	
578- CONROD	1801	1801	1802	1		.060000			.0139	
579- CONROD	1802	1802	1803	1		.060000			.0139	
580- CONROD	1803	1803	1804	1		.060000			.0139	
581- CONROD	1804	1804	1805	1		.060000			.0139	
582- CONROD	1805	1805	1806	1		.060000			.0140	
583- CONROD	1806	1801	1807	1		.090000				
584- CONROD	1807	1802	1808	1		.040000				
585- CONROD	1808	1803	1809	1		.040000				
586- CONROD	1809	1804	1810	1		.040000				
587- CONROD	1810	1805	1811	1		.023000				
588- CONROD	1811	1806	1812	1		.023000			.0140	
589- CONROD	1812	1807	1808	1		.060000			.0139	
590- CONROD	1813	1808	1809	1		.060000			.0139	
591- CONROD	1814	1809	1810	1		.060000			.0139	
592- CONROD	1815	1810	1811	1		.060000			.0139	
593- CONROD	1816	1811	1812	1		.060000			.0140	
594- CONROD	1817	1811	1813	1		.045000				
595- CONROD	1818	1812	1814	1		.045000			.0184	
596- CONROD	1819	1813	1814	1		.040000				
597- CONROD	1820	1813	1815	1		.050000				
598- CONROD	1821	1814	1817	1		.050000			.0214	
599- CONROD	1822	1815	1817	1		.040000				
600- CONROD	1823	1815	1818	1		.050000				

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D B U L K D A T A E C H O										
CARD	1	2	3	4	5	6	7	8	9	10
601-	CONROD	1824	1817	1820	1	.056000			.0251	
602-	CONROD	1825	1818	1819	1	.040000				
603-	CONROD	1826	1819	1820	1	.040000				
604-	CONROD	1827	1818	1822	1	.062000				
605-	CONROD	1828	1819	1823	1	.020000				
606-	CONROD	1829	1820	1824	1	.062000			.0227	
607-	CONROD	1830	1821	1822	1	.061000			.0216	
608-	CONROD	1831	1822	1823	1	.061000			.0216	
609-	CONROD	1832	1823	1824	1	.040000			.0216	
610-	CONROD	1833	1821	1825	1	.020000				
611-	CONROD	1834	1822	1826	1	.060000				
612-	CONROD	1835	1823	1827	1	.040000				
613-	CONROD	1836	1824	1828	1	.065000			.0430	
614-	CONROD	1837	1825	1826	1	.013000				
615-	CONROD	1838	1826	1827	1	.025000				
616-	CONROD	1839	1827	1828	1	.040000				
617-	CONROD	1840	1826	1830	1	.070000				
618-	CONROD	1841	1827	1831	1	.040000				
619-	CONROD	1842	1828	1832	1	.070000			.0439	
620-	CONROD	1843	1829	1830	1	.030000				
621-	CONROD	1844	1830	1831	1	.030000				
622-	CONROD	1845	1831	1832	1	.040000				
623-	CONROD	1846	1829	1833	1	.020000				
624-	CONROD	1847	1830	1834	1	.065000				
625-	CONROD	1848	1831	1835	1	.040000				
626-	CONROD	1849	1832	1836	1	.065000			.0430	
627-	CONROD	1850	1833	1834	1	.040000				
628-	CONROD	1851	1834	1835	1	.040000				
629-	CONROD	1852	1833	1837	1	.020000				
630-	CONROD	1853	1834	1838	1	.060000				
631-	CONROD	1854	1835	1836	1	.040000				
632-	CONROD	1855	1837	1838	1	.055000			.0310	
633-	CONROD	1856	1838	1836	1	.060000			.0430	
634-	CONROD	1901	1901	1902	1	.057000			.0280	
635-	CONROD	1902	1902	1903	1	.033000			.0092	
636-	CONROD	1903	1903	1904	1	.060000			.0140	
637-	CONROD	1904	1904	1905	1	.060000			.0140	
638-	CONROD	1905	1901	1906	1	.020000				
639-	CONROD	1906	1902	1907	1	.037000				
640-	CONROD	1907	1903	1908	1	.057000				
641-	CONROD	1908	1904	1909	1	.040000				
642-	CONROD	1909	1906	1910	1	.020000				
643-	CONROD	1910	1907	1911	1	.037000				
644-	CONROD	1911	1908	1912	1	.057000				
645-	CONROD	1912	1909	1913	1	.040000				
646-	CONROD	1913	1910	1911	1	.032000				
647-	CONROD	1914	1911	1912	1	.007600				
648-	CONROD	1915	1912	1913	1	.015200				
649-	CONROD	1916	1910	1914	1	.020000				
650-	CONROD	1917	1911	1915	1	.037000				

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O										
CARD	1	2	3	4	5	6	7	8	9	10
651- CONROD	1918	1912	1916	1		.057000				
652- CONROD	1919	1913	1917	1		.040000				
653- CONROD	1920	1914	1915	1		.052000			.0220	
654- CONROD	1921	1915	1916	1		.028000			.0065	
655- CONROD	1922	1916	1917	1		.060000			.0140	
656- CONROD	1923	1917	1918	1		.060000			.0140	
657- CONROD	1924	1906	1907	1		.036000				
658- CONROD	1925	1907	1908	1		.012000				
659- CONROD	1926	1908	1909	1		.024000				
660- CONROD	2001	2001	2002	1		.018000			.0222	
661- CONROD	2002	2002	2003	1		.018000			.0222	
662- CONROD	2003	2003	2004	1		.018000			.0222	
663- CONROD	2004	2004	2005	1		.012000			.0222	
664- CONROD	2005	2005	2010	1		.080000			.0284	
665- CONROD	2006	2010	2015	1		.080000			.0284	
666- CONROD	2007	2011	2012	1		.145000				
667- CONROD	2008	2012	2013	1		.145000				
668- CONROD	2009	2013	2014	1		.145000				
669- CONROD	2010	2014	2015	1		.192000			.0244	
670- CONROD	2011	2015	2020	1		.080000			.0284	
671- CONROD	2012	2014	2019	1		.033200				
672- CONROD	2013	2011	2016	1		.014800				
673- CONROD	2014	2020	2025	1		.080000			.0284	
674- CONROD	2015	2019	2024	1		.033200				
675- CONROD	2016	2016	2021	1		.014800				
676- CONROD	2017	2025	2030	1		.080000			.0284	
677- CONROD	2018	2024	2029	1		.033200				
678- CONROD	2019	2021	2026	1		.014800				
679- CONROD	2020	2030	2029	1		.088000			.0168	
680- CONROD	2021	2029	2028	1		.088000				
681- CONROD	2022	2028	2027	1		.088000				
682- CONROD	2023	2027	2026	1		.078000				
683- CONROD	2024	2030	2035	1		.080000			.0284	
684- CONROD	2025	2035	2039	1		.080000			.0284	
685- CONROD	2026	2039	2042	1		.080000			.0284	
686- CONROD	2027	2042	2041	1		.120000			.0284	
687- CONROD	2028	2041	2040	1		.120000			.0404	
688- CONROD	2029	2041	2037	1		.050000				
689- CONROD	2030	2024	2025	1		.080000				
690- CONROD	2500	120	160	11		.104000				
691- CONROD	2501	160	230	11		.104000				
692- CONROD	2550	1115	1157	11		.057600				
693- CONROD	2551	1157	1212	11		.057600				
694- CONROD	2552	1212	1312	11		.057600				
695- CONROD	2553	1312	1410	11		.057600				
696- CONROD	2554	1410	1502	11		.057600				
697- CONROD	2555	1502	1610	11		.057600				
698- CONROD	2556	1610	1656	11		.057600				
699- CONROD	2557	1656	1710	11		.057600				
700- CONROD	2558	1710	1812	11		.057600				

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

SORTED BULK DATA ECHO

CARD	COUNT	1	2	3	4	5	6	7	8	9	10
701-	CONROD	2559	1812	1918	11		.057600				
702-	CONROD	2560	1918	2010	11		.046400				
703-	CONROD	2561	101	151	11		.054500				
704-	CONROD	2562	151	201	11		.054500				
705-	CONROD	2563	201	401	11		.069000				
706-	CONROD	2564	301	501	11		.069000				
707-	CONROD	2565	501	601	11		.069000				
708-	CONROD	2566	601	701	11		.069000				
709-	CONROD	2567	701	751	11		.069000				
710-	CONROD	2568	751	801	11		.069000				
711-	CONROD	2569	801	901	11		.069000				
712-	CONROD	2570	901	1001	11		.087500				
713-	CONROD	2571	1001	1101	11		.087500				
714-	CONROD	2572	1101	1151	11		.087500				
715-	CONROD	2573	1151	1201	11		.087500				
716-	CONROD	2574	1201	1301	11		.087500				
717-	CONROD	2575	1301	1401	11		.087500				
718-	CONROD	2576	1401	1511	11		.087500				
719-	CONROD	2577	1511	1601	11		.087500				
720-	CONROD	2578	1601	1651	11		.087500				
721-	CONROD	2579	1651	1701	11		.087500				
722-	CONROD	2580	305	505	11		.072				
723-	CONROD	2581	505	605	11		.072				
724-	CONROD	2582	605	705	11		.072				
725-	CONROD	2583	705	755	11		.072				
726-	CONROD	2584	755	805	11		.072				
727-	CONROD	2585	805	905	11		.072				
728-	CONROD	2586	905	1005	11		.072				
729-	CONROD	2587	1005	1105	11		.072				
730-	CONROD	2588	1105	1155	11		.0672				
731-	CONROD	2589	1155	1205	11		.0542				
732-	CONROD	2590	1205	1305	11		.0460				
733-	CONROD	2591	1305	1405	11		.0460				
734-	CONROD	2592	1405	1515	11		.0460				
735-	CONROD	2593	1515	1605	11		.0460				
736-	CONROD	2594	1605	1655	11		.0460				
737-	CONROD	2595	1655	1705	11		.0460				
738-	CONROD	2596	1705	1806	11		.0460				
739-	CONROD	2597	1806	1905	11		.0460				
740-	CONROD	2598	1905	2005	11		.0460				
741-	CONROD	2599	2005	2105	11		.0460				
742-	CONROD	2642	1721	1722	1		.042000				
743-	CONROD	2643	1706	1722	11		.042000				
744-	CONROD	2644	1722	1808	11		.042000				
745-	CONROD	2647	1206	1306	1		.01				
746-	CONROD	2660	115	158	11		.095				
747-	CONROD	2661	158	224	11		.095				
748-	CONROD	2662	111	166	11		.0915				
749-	CONROD	2663	166	219	11		.0915				
750-	CONROD	2695	1511	1516	1		.01				

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O											
CARD	COUNT	1	2	3	4	5	6	7	8	9	10
751-	CONROD	2696	1723	1724	1		.02				
752-	CONROD	2697	1721	1723	1		.04				
753-	CONROD	2698	1722	1724	1		.04				
754-	CONROD	2709	1821	1930	11		.048500				
755-	CONROD	2710	1930	1934	11		.048500				
756-	CONROD	2711	1934	2026	11		.074500				
757-	CONROD	2712	1933	2029	11		.045000				
758-	CONROD	2714	1922	1932	11		.060100				
759-	CONROD	2715	1932	2030	11		.045800				
760-	CONROD	2716	1936	2011	11		.034000				
761-	CONROD	2717	1721	1935	11		.128000				
762-	CONROD	2718	1935	2014	11		.420000				
763-	CONROD	2719	1936	1935	11		.033200				
764-	CONROD	2720	1934	1936	11		.0148				
765-	CONROD	2721	1933	1935	11		.0332				
766-	CONROD	2800	911	1011	11		.0875				
767-	CONROD	2801	1011	1111	11		.0875				
768-	CONROD	2802	1111	1162	11		.0875				
769-	CONROD	2803	1162	1221	11		.0875				
770-	CONROD	2804	1221	1321	11		.0875				
771-	CONROD	2805	1321	1406	11		.0875				
772-	CONROD	2806	1406	1516	11		.0875				
773-	CONROD	2807	1516	1606	11		.0875				
774-	CONROD	2808	1606	1661	11		.0875				
775-	CONROD	2809	1661	1706	11		.0875				
776-	CONROD	2810	206	305	11		.072				
777-	CORD2R	1	0	-81.5683.0		35.5985	-80.2278.0			57.5136	6C1
778-	6C1	68.25	.0	48.432							
779-	CQDMEM2	161	10161	101	102	107	106	0.0			
780-	CQDMEM2	162	10162	102	103	108	107	0.0			
781-	CQDMEM2	163	10163	103	104	109	108	0.0			
782-	CQDMEM2	164	10164	104	105	110	109	0.0			
783-	CQDMEM2	165	10165	106	107	112	111	0.0			
784-	CQDMEM2	166	10166	107	108	113	112	0.0			
785-	CQDMEM2	167	10167	108	109	114	113	0.0			
786-	CQDMEM2	168	10168	109	110	115	114	0.0			
787-	CQDMEM2	169	10169	111	112	117	116	0.0			
788-	CQDMEM2	170	10170	112	113	118	117	0.0			
789-	CQDMEM2	171	10171	113	114	119	118	0.0			
790-	CQDMEM2	172	10172	114	115	120	119	0.0			
791-	CQDMEM2	173	10173	116	117	122	121	0.0			
792-	CQDMEM2	174	10174	117	118	123	122	0.0			
793-	CQDMEM2	175	10175	118	119	124	123	0.0			
794-	CQDMEM2	176	10176	119	120	125	124	0.0			
795-	CQDMEM2	177	10177	124	125	127	126	0.0			
796-	CQDMEM2	270	10270	201	202	208	207	0.0			
797-	CQDMEM2	271	10271	202	203	209	208	0.0			
798-	CQDMEM2	272	10272	203	204	210	209	0.0			
799-	CQDMEM2	273	10273	204	205	211	210	0.0			
800-	CQDMEM2	274	10274	205	206	212	211	0.0			

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O										
CARD	1	2	3	4	5	6	7	8	9	10
801- CQDMEM2 275	10275	207	208	214	213	0.0				
802- CQDMEM2 276	10276	208	209	215	214	0.0				
803- CQDMEM2 277	10277	209	210	216	215	0.0				
804- CQDMEM2 278	10278	210	211	217	216	0.0				
805- CQDMEM2 279	10279	211	212	218	217	0.0				
806- CQDMEM2 280	10280	213	214	220	219	0.0				
807- CQDMEM2 281	10281	214	215	221	220	0.0				
808- CQDMEM2 282	10282	215	216	222	221	0.0				
809- CQDMEM2 283	10283	216	217	223	222	0.0				
810- CQDMEM2 284	10284	217	218	224	223	0.0				
811- CQDMEM2 285	10285	222	223	226	225	0.0				
812- CQDMEM2 286	10286	223	224	227	226	0.0				
813- CQDMEM2 2040	12040	2001	2002	2007	2006	0.0				
814- CQDMEM2 2041	12041	2002	2003	2008	2007	0.0				
815- CQDMEM2 2042	12042	2003	2004	2009	2008	0.0				
816- CQDMEM2 2043	12043	2004	2005	2010	2009	0.0				
817- CQDMEM2 2044	12044	2006	2007	2012	2011	0.0				
818- CQDMEM2 2045	12045	2007	2008	2013	2012	0.0				
819- CQDMEM2 2046	12046	2008	2009	2014	2013	0.0				
820- CQDMEM2 2047	12047	2009	2010	2015	2014	0.0				
821- CQDMEM2 2048	12048	2011	2012	2017	2016	0.0				
822- CQDMEM2 2049	12049	2012	2013	2018	2017	0.0				
823- CQDMEM2 2050	12050	2013	2014	2019	2018	0.0				
824- CQDMEM2 2051	12051	2014	2015	2020	2019	0.0				
825- CQDMEM2 2052	12052	2016	2017	2022	2021	0.0				
826- CQDMEM2 2053	12053	2017	2018	2023	2022	0.0				
827- CQDMEM2 2054	12054	2018	2019	2024	2023	0.0				
828- CQDMEM2 2055	12055	2019	2020	2025	2024	0.0				
829- CQDMEM2 2056	12056	2021	2022	2027	2026	0.0				
830- CQDMEM2 2057	12057	2022	2023	2028	2027	0.0				
831- CQDMEM2 2058	12058	2023	2024	2029	2028	0.0				
832- CQDMEM2 2059	12059	2024	2025	2030	2029	0.0				
833- CQDMEM2 2060	12060	2026	2027	2032	2031	0.0				
834- CQDMEM2 2061	12061	2027	2028	2033	2032	0.0				
835- CQDMEM2 2062	12062	2028	2029	2034	2033	0.0				
836- CQDMEM2 2063	12063	2029	2030	2035	2034	0.0				
837- CQDMEM2 2064	12064	2031	2032	2037	2036	0.0				
838- CQDMEM2 2065	12065	2032	2033	2038	2037	0.0				
839- CQDMEM2 2066	12066	2033	2034	2039	2038	0.0				
840- CQDMEM2 2068	12068	2036	2037	2041	2040	0.0				
841- CQDMEM2 2069	12069	2037	2038	2042	2041	0.0				
842- CQDMEM2 2200	12200	102	152	151	101	0.0				
843- CQDMEM2 2201	12201	103	153	152	102	0.0				
844- CQDMEM2 2202	12202	104	154	153	103	0.0				
845- CQDMEM2 2203	12203	105	155	154	104	0.0				
846- CQDMEM2 2204	12204	105	155	156	110	0.0				
847- CQDMEM2 2205	12205	152	202	201	151	0.0				
848- CQDMEM2 2206	12206	153	203	202	152	0.0				
849- CQDMEM2 2207	12207	154	204	203	153	0.0				
850- CQDMEM2 2208	12208	155	205	204	154	0.0				



PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O									
CARD	1	2	3	4	5	6	7	8	9
COUNT .	1	2	3	4	5	6	7	8	9
851- CQD MEM2 2209	12209	156	206	205	155	0.0			
852- CQD MEM2 2210	12210	202	302	401	201	0.0			
853- CQD MEM2 2211	12211	203	303	302	202	0.0			
854- CQD MEM2 2212	12212	204	304	303	203	0.0			
855- CQD MEM2 2213	12213	206	305	304	204	0.0			
856- CQD MEM2 2214	12214	302	502	501	301	0.0			
857- CQD MEM2 2215	12215	303	503	502	302	0.0			
858- CQD MEM2 2216	12216	304	504	503	303	0.0			
859- CQD MEM2 2217	12217	305	505	504	304	0.0			
860- CQD MEM2 2218	12218	502	602	601	501	0.0			
861- CQD MEM2 2219	12219	503	603	602	502	0.0			
862- CQD MEM2 2220	12220	504	604	603	503	0.0			
863- CQD MEM2 2221	12221	505	605	604	504	0.0			
864- CQD MEM2 2222	12222	602	702	701	601	0.0			
865- CQD MEM2 2223	12223	603	703	702	602	0.0			
866- CQD MEM2 2224	12224	604	704	703	603	0.0			
867- CQD MEM2 2225	12225	605	705	704	604	0.0			
868- CQD MEM2 2226	12226	702	752	751	701	0.0			
869- CQD MEM2 2227	12227	703	753	752	702	0.0			
870- CQD MEM2 2228	12228	704	754	753	703	0.0			
871- CQD MEM2 2229	12229	705	755	754	704	0.0			
872- CQD MEM2 2230	12230	752	802	801	751	0.0			
873- CQD MEM2 2231	12231	753	803	802	752	0.0			
874- CQD MEM2 2232	12232	754	804	803	753	0.0			
875- CQD MEM2 2233	12233	755	805	804	754	0.0			
876- CQD MEM2 2234	12234	802	902	901	801	0.0			
877- CQD MEM2 2235	12235	803	903	902	802	0.0			
878- CQD MEM2 2236	12236	804	904	903	803	0.0			
879- CQD MEM2 2237	12237	805	905	904	804	0.0			
880- CQD MEM2 2238	12238	902	1002	1001	901	0.0			
881- CQD MEM2 2239	12239	903	1003	1002	902	0.0			
882- CQD MEM2 2240	12240	904	1004	1003	903	0.0			
883- CQD MEM2 2241	12241	905	1005	1004	904	0.0			
884- CQD MEM2 2242	12242	1002	1102	1101	1001	0.0			
885- CQD MEM2 2243	12243	1003	1103	1102	1002	0.0			
886- CQD MEM2 2244	12244	1004	1104	1103	1003	0.0			
887- CQD MEM2 2245	12245	1005	1105	1104	1004	0.0			
888- CQD MEM2 2246	12246	1102	1152	1151	1101	0.0			
889- CQD MEM2 2247	12247	1103	1153	1152	1102	0.0			
890- CQD MEM2 2248	12248	1104	1154	1153	1103	0.0			
891- CQD MEM2 2249	12249	1105	1155	1154	1104	0.0			
892- CQD MEM2 2250	12250	1152	1202	1201	1151	0.0			
893- CQD MEM2 2251	12251	1153	1203	1202	1152	0.0			
894- CQD MEM2 2252	12252	1154	1204	1203	1153	0.0			
895- CQD MEM2 2253	12253	1155	1205	1204	1154	0.0			
896- CQD MEM2 2254	12254	1202	1302	1301	1201	0.0			
897- CQD MEM2 2255	12255	1203	1303	1302	1202	0.0			
898- CQD MEM2 2256	12256	1204	1304	1303	1203	0.0			
899- CQD MEM2 2257	12257	1205	1305	1304	1204	0.0			
900- CQD MEM2 2258	12258	1302	1402	1401	1301	0.0			

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O									
CARD	1	2	3	4	5	6	7	8	9
COUNT	1	2	3	4	5	6	7	8	9
901-	CQDMEM2	2259	12259	1303	1403	1402	1302	0.0	
902-	CQDMEM2	2260	12260	1304	1404	1403	1303	0.0	
903-	CQDMEM2	2261	12261	1305	1405	1404	1304	0.0	
904-	CQDMEM2	2262	12262	1402	1512	1511	1401	0.0	
905-	CQDMEM2	2263	12263	1403	1513	1512	1402	0.0	
906-	CQDMEM2	2264	12264	1404	1514	1513	1403	0.0	
907-	CQDMEM2	2265	12265	1405	1515	1514	1404	0.0	
908-	CQDMEM2	2266	12266	1512	1602	1601	1511	0.0	
909-	CQDMEM2	2267	12267	1513	1603	1602	1512	0.0	
910-	CQDMEM2	2268	12268	1514	1604	1603	1513	0.0	
911-	CQDMEM2	2269	12269	1515	1605	1604	1514	0.0	
912-	CQDMEM2	2270	12270	1602	1652	1651	1601	0.0	
913-	CQDMEM2	2271	12271	1603	1653	1652	1602	0.0	
914-	CQDMEM2	2272	12272	1604	1654	1653	1603	0.0	
915-	CQDMEM2	2273	12273	1605	1655	1654	1604	0.0	
916-	CQDMEM2	2274	12274	1652	1702	1701	1651	0.0	
917-	CQDMEM2	2275	12275	1653	1703	1702	1652	0.0	
918-	CQDMEM2	2276	12276	1654	1704	1703	1653	0.0	
919-	CQDMEM2	2277	12277	1655	1705	1704	1654	0.0	
920-	CQDMEM2	2279	12279	1703	1803	1802	1702	0.0	
921-	CQDMEM2	2280	12280	1704	1804	1803	1703	0.0	
922-	CQDMEM2	2281	12281	1705	1806	1804	1704	0.0	
923-	CQDMEM2	2282	12282	1802	1902	1901	1801	0.0	
924-	CQDMEM2	2283	12283	1803	1903	1902	1802	0.0	
925-	CQDMEM2	2284	12284	1804	1904	1903	1803	0.0	
926-	CQDMEM2	2285	12285	1806	1905	1904	1804	0.0	
927-	CQDMEM2	2286	12286	1902	2002	2001	1901	0.0	
928-	CQDMEM2	2287	12287	1903	2003	2002	1902	0.0	
929-	CQDMEM2	2288	12288	1904	2004	2003	1903	0.0	
930-	CQDMEM2	2289	12289	1905	2005	2004	1904	0.0	
931-	CQDMEM2	2290	12290	2002	2102	2101	2001	0.0	
932-	CQDMEM2	2291	12291	2003	2103	2102	2002	0.0	
933-	CQDMEM2	2292	12292	2004	2104	2103	2003	0.0	
934-	CQDMEM2	2293	12293	2005	2105	2104	2004	0.0	
935-	CQDMEM2	2300	12300	110	156	158	115	0.0	
936-	CQDMEM2	2301	12301	115	158	160	120	0.0	
937-	CQDMEM2	2302	12302	120	160	161	125	0.0	
938-	CQDMEM2	2303	12303	125	161	162	127	0.0	
939-	CQDMEM2	2304	12304	127	162	163	129	0.0	
940-	CQDMEM2	2305	12305	129	163	164	131	0.0	
941-	CQDMEM2	2306	12306	156	206	218	157	0.0	
942-	CQDMEM2	2307	12307	157	218	224	158	0.0	
943-	CQDMEM2	2308	12308	158	224	227	159	0.0	
944-	CQDMEM2	2309	12309	159	227	230	160	0.0	
945-	CQDMEM2	2310	12310	160	230	233	161	0.0	
946-	CQDMEM2	2311	12311	161	233	236	162	0.0	
947-	CQDMEM2	2312	12312	162	236	239	163	0.0	
948-	CQDMEM2	2313	12313	163	239	242	164	0.0	
949-	CQDMEM2	2314	12314	206	305	310	212	0.0	
950-	CQDMEM2	2315	12315	212	310	312	218	0.0	

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

SORTED BULK DATA ECHO											
CARD	COUNT	1	2	3	4	5	6	7	8	9	10
951-	CQDMEM2	2316	12316	218	312	314	224	0.0			
952-	CQDMEM2	2317	12317	224	314	316	227	0.0			
953-	CQDMEM2	2318	12318	227	316	318	230	0.0			
954-	CQDMEM2	2319	12319	305	505	510	310	0.0			
955-	CQDMEM2	2320	12320	310	510	512	312	0.0			
956-	CQDMEM2	2321	12321	312	512	514	314	0.0			
957-	CQDMEM2	2322	12322	314	514	516	316	0.0			
958-	CQDMEM2	2323	12323	316	516	518	318	0.0			
959-	CQDMEM2	2324	12324	505	605	610	510	0.0			
960-	CQDMEM2	2325	12325	510	610	612	512	0.0			
961-	CQDMEM2	2326	12326	512	612	614	514	0.0			
962-	CQDMEM2	2327	12327	514	614	616	516	0.0			
963-	CQDMEM2	2328	12328	516	616	618	518	0.0			
964-	CQDMEM2	2329	12329	605	705	710	610	0.0			
965-	CQDMEM2	2330	12330	610	710	712	612	0.0			
966-	CQDMEM2	2331	12331	612	712	714	614	0.0			
967-	CQDMEM2	2332	12332	614	714	716	616	0.0			
968-	CQDMEM2	2333	12333	616	716	718	618	0.0			
969-	CQDMEM2	2334	12334	705	755	756	710	0.0			
970-	CQDMEM2	2335	12335	710	756	757	712	0.0			
971-	CQDMEM2	2336	12336	712	757	758	714	0.0			
972-	CQDMEM2	2337	12337	714	758	759	716	0.0			
973-	CQDMEM2	2338	12338	716	759	760	718	0.0			
974-	CQDMEM2	2339	12339	755	805	810	756	0.0			
975-	CQDMEM2	2340	12340	756	810	812	757	0.0			
976-	CQDMEM2	2341	12341	757	812	814	758	0.0			
977-	CQDMEM2	2342	12342	758	814	816	759	0.0			
978-	CQDMEM2	2343	12343	759	816	818	760	0.0			
979-	CQDMEM2	2344	12344	805	905	910	810	0.0			
980-	CQDMEM2	2345	12345	810	910	917	812	0.0			
981-	CQDMEM2	2346	12346	812	917	919	814	0.0			
982-	CQDMEM2	2347	12347	814	919	921	816	0.0			
983-	CQDMEM2	2348	12348	816	921	923	818	0.0			
984-	CQDMEM2	2349	12349	905	1005	1010	910	0.0			
985-	CQDMEM2	2350	12350	910	1010	1015	915	0.0			
986-	CQDMEM2	2351	12351	915	1015	1017	917	0.0			
987-	CQDMEM2	2352	12352	917	1017	1019	919	0.0			
988-	CQDMEM2	2353	12353	919	1019	1021	921	0.0			
989-	CQDMEM2	2354	12354	921	1021	1023	923	0.0			
990-	CQDMEM2	2355	12355	1005	1105	1110	1010	0.0			
991-	CQDMEM2	2356	12356	1010	1110	1115	1015	0.0			
992-	CQDMEM2	2357	12357	1015	1115	1117	1017	0.0			
993-	CQDMEM2	2358	12358	1017	1117	1119	1019	0.0			
994-	CQDMEM2	2359	12359	1019	1119	1121	1021	0.0			
995-	CQDMEM2	2360	12360	1021	1121	1123	1023	0.0			
996-	CQDMEM2	2361	12361	1105	1155	1156	1110	0.0			
997-	CQDMEM2	2362	12362	1110	1156	1157	1115	0.0			
998-	CQDMEM2	2363	12363	1115	1157	1158	1117	0.0			
999-	CQDMEM2	2364	12364	1117	1158	1159	1119	0.0			
1000-	CQDMEM2	2365	12365	1119	1159	1160	1121	0.0			

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D B U L K D A T A E C H O											
CARD	CDUNT	1	2	3	4	5	6	7	8	9	10
1001-	CQDMEM2	2366	12366	1121	1160	1161	1123	0.0			
1002-	CQDMEM2	2367	12367	1155	1205	1210	1156	0.0			
1003-	CQDMEM2	2368	12368	1156	1210	1212	1157	0.0			
1004-	CQDMEM2	2369	12369	1157	1212	1214	1158	0.0			
1005-	CQDMEM2	2370	12370	1158	1214	1216	1159	0.0			
1006-	CQDMEM2	2371	12371	1159	1216	1218	1160	0.0			
1007-	CQDMEM2	2372	12372	1160	1218	1220	1161	0.0			
1008-	CQDMEM2	2373	12373	1205	1305	1310	1210	0.0			
1009-	CQDMEM2	2374	12374	1210	1310	1312	1212	0.0			
1010-	CQDMEM2	2375	12375	1212	1312	1314	1214	0.0			
1011-	CQDMEM2	2376	12376	1214	1314	1316	1216	0.0			
1012-	CQDMEM2	2377	12377	1216	1316	1318	1218	0.0			
1013-	CQDMEM2	2378	12378	1218	1318	1320	1220	0.0			
1014-	CQDMEM2	2379	12379	1312	1410	1412	1314	0.0			
1015-	CQDMEM2	2380	12380	1314	1412	1414	1316	0.0			
1016-	CQDMEM2	2381	12381	1316	1414	1416	1318	0.0			
1017-	CQDMEM2	2382	12382	1318	1416	1418	1320	0.0			
1018-	CQDMEM2	2383	12383	1410	1502	1504	1412	0.0			
1019-	CQDMEM2	2384	12384	1412	1504	1506	1414	0.0			
1020-	CQDMEM2	2385	12385	1414	1506	1508	1416	0.0			
1021-	CQDMEM2	2386	12386	1416	1508	1510	1418	0.0			
1022-	CQDMEM2	2387	12387	1502	1610	1612	1504	0.0			
1023-	CQDMEM2	2388	12388	1504	1612	1614	1506	0.0			
1024-	CQDMEM2	2389	12389	1506	1614	1616	1508	0.0			
1025-	CQDMEM2	2390	12390	1508	1616	1618	1510	0.0			
1026-	CQDMEM2	2391	12391	1610	1656	1657	1612	0.0			
1027-	CQDMEM2	2392	12392	1612	1657	1658	1614	0.0			
1028-	CQDMEM2	2393	12393	1614	1658	1659	1616	0.0			
1029-	CQDMEM2	2394	12394	1616	1659	1660	1618	0.0			
1030-	CQDMEM2	2395	12395	1656	1710	1712	1657	0.0			
1031-	CQDMEM2	2396	12396	1657	1712	1714	1658	0.0			
1032-	CQDMEM2	2397	12397	1658	1714	1716	1659	0.0			
1033-	CQDMEM2	2398	12398	1659	1716	1718	1660	0.0			
1034-	CQDMEM2	2399	12399	1710	1812	1814	1712	0.0			
1035-	CQDMEM2	2400	12400	1712	1814	1817	1714	0.0			
1036-	CQDMEM2	2401	12401	1714	1817	1820	1716	0.0			
1037-	CQDMEM2	2402	12402	1716	1820	1824	1718	0.0			
1038-	CQDMEM2	2403	12403	1812	1918	1919	1814	0.0			
1039-	CQDMEM2	2404	12404	1814	1919	1920	1817	0.0			
1040-	CQDMEM2	2405	12405	1817	1920	1921	1820	0.0			
1041-	CQDMEM2	2406	12406	1820	1921	1922	1824	0.0			
1042-	CQDMEM2	2407	12407	1824	1922	1923	1828	0.0			
1043-	CQDMEM2	2408	12408	1828	1923	1924	1832	0.0			
1044-	CQDMEM2	2409	12409	1832	1924	1925	1836	0.0			
1045-	CQDMEM2	2410	12410	1836	1925	1926	1838	0.0			
1046-	CQDMEM2	2411	12411	1838	1926	1927	1837	0.0			
1047-	CQDMEM2	2412	12412	1905	2005	2010	1918	0.0			
1048-	CQDMEM2	2413	12413	1918	2010	2015	1919	0.0			
1049-	CQDMEM2	2414	12414	1919	2015	2020	1920	0.0			
1050-	CQDMEM2	2415	12415	1920	2020	2025	1921	0.0			

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D B U L K D A T A E C H O										
CARD	1	2	3	4	5	6	7	8	9	10
1051- CQDMEM2 2416	12416	1921	1931	1932	1922	0.0				
1052- CQDMEM2 2417	12417	1931	2025	2030	1932	0.0				
1053- CQDMEM2 2418	12418	1922	2030	2035	1923	0.0				
1054- CQDMEM2 2419	12419	1923	2035	2039	1924	0.0				
1055- CQDMEM2 2420	12420	1924	2039	2042	1925	0.0				
1056- CQDMEM2 2421	12421	1925	2042	2041	1926	0.0				
1057- CQDMEM2 2422	12422	1926	2041	2040	1927	0.0				
1058- CQDMEM2 2423	12423	2005	2105	2106	2010	0.0				
1059- CQDMEM2 2424	12424	2010	2106	2107	2015	0.0				
1060- CQDMEM2 2425	12425	2015	2107	2108	2020	0.0				
1061- CQDMEM2 2426	12426	2020	2108	2109	2025	0.0				
1062- CQDMEM2 2427	12427	2025	2109	2110	2030	0.0				
1063- CQDMEM2 2428	12428	2030	2110	2111	2035	0.0				
1064- CQDMEM2 2429	12429	2035	2111	2112	2039	0.0				
1065- CQDMEM2 2430	12430	2039	2112	2113	2042	0.0				
1066- CQDMEM2 2431	12431	2042	2113	2114	2041	0.0				
1067- CQDMEM2 2432	12432	2041	2114	2115	2040	0.0				
1068- CQDMEM2 2600	12600	1407	1517	1516	1406	0.0				
1069- CQDMEM2 2601	12601	1408	1518	1517	1407	0.0				
1070- CQDMEM2 2602	12602	1409	1501	1518	1408	0.0				
1071- CQDMEM2 2603	12603	1419	1519	1501	1409	0.0				
1072- CQDMEM2 2604	12604	1410	1502	1519	1419	0.0				
1073- CQDMEM2 2605	12605	1517	1607	1606	1516	0.0				
1074- CQDMEM2 2606	12606	1518	1608	1607	1517	0.0				
1075- CQDMEM2 2607	12607	1501	1609	1608	1518	0.0				
1076- CQDMEM2 2608	12608	1519	1619	1609	1501	0.0				
1077- CQDMEM2 2609	12609	1502	1610	1619	1519	0.0				
1078- CQDMEM2 2610	12610	1607	1662	1661	1606	0.0				
1079- CQDMEM2 2611	12611	1608	1663	1662	1607	0.0				
1080- CQDMEM2 2612	12612	1609	1664	1663	1608	0.0				
1081- CQDMEM2 2613	12613	1620	1665	1664	1609	0.0				
1082- CQDMEM2 2614	12614	1610	1656	1665	1620	0.0				
1083- CQDMEM2 2615	12615	1662	1707	1706	1661	0.0				
1084- CQDMEM2 2616	12616	1663	1708	1707	1662	0.0				
1085- CQDMEM2 2617	12617	1664	1709	1708	1663	0.0				
1086- CQDMEM2 2618	12618	1665	1719	1709	1664	0.0				
1087- CQDMEM2 2619	12619	1656	1710	1719	1665	0.0				
1088- CQDMEM2 2621	12621	1708	1809	1808	1707	0.0				
1089- CQDMEM2 2622	12622	1709	1810	1809	1708	0.0				
1090- CQDMEM2 2623	12623	1720	1811	1810	1709	0.0				
1091- CQDMEM2 2624	12624	1710	1812	1811	1720	0.0				
1092- CQDMEM2 2625	12625	1808	1915	1914	1807	0.0				
1093- CQDMEM2 2626	12626	1809	1916	1915	1808	0.0				
1094- CQDMEM2 2627	12627	1810	1917	1916	1809	0.0				
1095- CQDMEM2 2628	12628	1811	1928	1917	1810	0.0				
1096- CQDMEM2 2629	12629	1812	1918	1928	1811	0.0				
1097- CQDMEM2 2648	12650	112	169	166	111	0.0				
1098- CQDMEM2 2649	12650	169	220	219	166	0.0				
1099- CQDMEM2 2650	12650	115	158	167	114	0.0				
1100- CQDMEM2 2651	12651	114	167	168	113	0.0				

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O											
CARD	COUNT	1	2	3	4	5	6	7	8	9	10
1101-	CQDMEM2	2652	12652	113	168	169	112	0.0			
1102-	CQDMEM2	2653	12653	158	224	222	167	0.0			
1103-	CQDMEM2	2654	12654	167	222	221	168	0.0			
1104-	CQDMEM2	2655	12655	168	221	220	169	0.0			
1105-	CQDMEM2	2656	12656	101	151	165	106	0.0			
1106-	CQDMEM2	2657	12657	106	165	166	111	0.0			
1107-	CQDMEM2	2658	12658	151	201	207	165	0.0			
1108-	CQDMEM2	2659	12659	165	207	219	166	0.0			
1109-	CQDMEM2	2700	12700	1821	1930	1929	1822	0.0			
1110-	CQDMEM2	2701	12701	1822	1929	1922	1824	0.0			
1111-	CQDMEM2	2702	12702	1930	1934	1933	1929	0.0			
1112-	CQDMEM2	2703	12703	1929	1933	1932	1922	0.0			
1113-	CQDMEM2	2704	12704	1934	2026	2029	1933	0.0			
1114-	CQDMEM2	2705	12705	1933	2029	2030	1932	0.0			
1115-	CSHEAR	178	10178	126	127	129	128				
1116-	CSHEAR	179	10179	128	129	131	130				
1117-	CSHEAR	287	10287	225	226	229	228				
1118-	CSHEAR	288	10288	226	227	230	229				
1119-	CSHEAR	289	10289	228	229	232	231				
1120-	CSHEAR	290	10290	229	230	233	232				
1121-	CSHEAR	291	10291	231	232	235	234				
1122-	CSHEAR	292	10292	232	233	236	235				
1123-	CSHEAR	293	10293	234	235	238	237				
1124-	CSHEAR	294	10294	235	236	239	238				
1125-	CSHEAR	295	10295	237	238	241	240				
1126-	CSHEAR	296	10296	238	239	242	241				
1127-	CSHEAR	351	10351	301	302	307	306				
1128-	CSHEAR	352	10352	302	303	308	307				
1129-	CSHEAR	353	10353	303	304	309	308				
1130-	CSHEAR	354	10354	304	305	310	309				
1131-	CSHEAR	355	10355	309	310	312	311				
1132-	CSHEAR	356	10356	311	312	314	313				
1133-	CSHEAR	357	10357	313	314	316	315				
1134-	CSHEAR	358	10358	315	316	318	317				
1135-	CSHEAR	401	10401	301	302	307	406				
1136-	CSHEAR	402	10402	302	303	308	407				
1137-	CSHEAR	403	10403	303	304	409	308				
1138-	CSHEAR	404	10404	304	305	310	409				
1139-	CSHEAR	551	10551	501	502	507	506				
1140-	CSHEAR	552	10552	502	503	508	507				
1141-	CSHEAR	553	10553	503	504	509	508				
1142-	CSHEAR	554	10554	504	505	510	509				
1143-	CSHEAR	555	10555	509	510	512	511				
1144-	CSHEAR	556	10556	511	512	514	513				
1145-	CSHEAR	557	10557	513	514	516	515				
1146-	CSHEAR	558	10558	515	516	518	517				
1147-	CSHEAR	651	10651	601	602	607	606				
1148-	CSHEAR	652	10652	602	603	608	607				
1149-	CSHEAR	653	10653	603	604	609	608				
1150-	CSHEAR	654	10654	604	605	610	609				

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O											
CARD		1	2	3	4	5	6	7	8	9	10
1151-	CSHEAR	655	10655	609	610	612	611				
1152-	CSHEAR	656	10656	611	612	614	613				
1153-	CSHEAR	657	10657	613	614	616	615				
1154-	CSHEAR	658	10658	615	616	618	617				
1155-	CSHEAR	751	10751	701	702	707	706				
1156-	CSHEAR	752	10752	702	703	708	707				
1157-	CSHEAR	753	10753	703	704	709	708				
1158-	CSHEAR	754	10754	704	705	710	709				
1159-	CSHEAR	755	10755	709	710	712	711				
1160-	CSHEAR	756	10756	711	712	714	713				
1161-	CSHEAR	757	10757	713	714	716	715				
1162-	CSHEAR	758	10758	715	716	718	717				
1163-	CSHEAR	851	10851	801	802	807	806				
1164-	CSHEAR	852	10852	802	803	808	807				
1165-	CSHEAR	853	10853	803	804	809	808				
1166-	CSHEAR	854	10854	804	805	810	809				
1167-	CSHEAR	855	10855	809	810	812	811				
1168-	CSHEAR	856	10856	811	812	814	813				
1169-	CSHEAR	857	10857	813	814	816	815				
1170-	CSHEAR	858	10858	815	816	818	817				
1171-	CSHEAR	951	10951	901	902	912	911				
1172-	CSHEAR	952	10952	902	903	913	912				
1173-	CSHEAR	953	10953	903	904	914	913				
1174-	CSHEAR	954	10954	904	905	915	914				
1175-	CSHEAR	959	10959	914	915	917	916				
1176-	CSHEAR	960	10960	916	917	919	918				
1177-	CSHEAR	961	10961	918	919	921	920				
1178-	CSHEAR	962	10962	920	921	923	922				
1179-	CSHEAR	1040	11040	1001	1002	1012	1011				
1180-	CSHEAR	1041	11041	1002	1003	1013	1012				
1181-	CSHEAR	1042	11042	1003	1004	1014	1013				
1182-	CSHEAR	1043	11043	1004	1005	1015	1014				
1183-	CSHEAR	1048	11048	1014	1015	1017	1016				
1184-	CSHEAR	1049	11049	1016	1017	1019	1018				
1185-	CSHEAR	1050	11050	1018	1019	1021	1020				
1186-	CSHEAR	1051	11051	1020	1021	1023	1022				
1187-	CSHEAR	1140	11140	1101	1102	1112	1111				
1188-	CSHEAR	1141	11141	1102	1103	1113	1112				
1189-	CSHEAR	1142	11142	1103	1104	1114	1113				
1190-	CSHEAR	1143	11143	1104	1105	1115	1114				
1191-	CSHEAR	1145	11145	1114	1115	1117	1116				
1192-	CSHEAR	1146	11146	1116	1117	1119	1118				
1193-	CSHEAR	1147	11147	1118	1119	1121	1120				
1194-	CSHEAR	1148	11148	1120	1121	1123	1122				
1195-	CSHEAR	1240	11240	1201	1202	1207	1206				
1196-	CSHEAR	1241	11241	1202	1203	1208	1207				
1197-	CSHEAR	1242	11242	1203	1204	1209	1208				
1198-	CSHEAR	1243	11243	1204	1205	1210	1209				
1199-	CSHEAR	1244	11244	1209	1210	1212	1211				
1200-	CSHEAR	1245	11245	1211	1212	1214	1213				

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O										
CARD										
COUNT	1	2	3	4	5	6	7	8	9	10
1201-	CSHEAR	1246	11246	1213	1214	1216	1215			
1202-	CSHEAR	1247	11247	1215	1216	1216	1217			
1203-	CSHEAR	1248	11248	1217	1218	1220	1219			
1204-	CSHEAR	1340	11340	1301	1302	1307	1306			
1205-	CSHEAR	1341	11341	1302	1303	1308	1307			
1206-	CSHEAR	1342	11342	1303	1304	1309	1308			
1207-	CSHEAR	1343	11343	1304	1305	1310	1309			
1208-	CSHEAR	1344	11344	1309	1310	1312	1311			
1209-	CSHEAR	1345	11345	1311	1312	1314	1313			
1210-	CSHEAR	1346	11346	1313	1314	1316	1315			
1211-	CSHEAR	1347	11347	1315	1316	1318	1317			
1212-	CSHEAR	1348	11348	1317	1318	1320	1319			
1213-	CSHEAR	1440	11440	1401	1402	1407	1406			
1214-	CSHEAR	1441	11441	1402	1403	1408	1407			
1215-	CSHEAR	1442	11442	1403	1404	1409	1408			
1216-	CSHEAR	1443	11443	1404	1405	1410	1409			
1217-	CSHEAR	1444	11444	1409	1410	1412	1411			
1218-	CSHEAR	1445	11445	1411	1412	1414	1413			
1219-	CSHEAR	1446	11446	1413	1414	1416	1415			
1220-	CSHEAR	1447	11447	1415	1416	1418	1417			
1221-	CSHEAR	1540	11540	1501	1502	1504	1503			
1222-	CSHEAR	1541	11541	1503	1504	1506	1505			
1223-	CSHEAR	1542	11542	1505	1506	1508	1507			
1224-	CSHEAR	1543	11543	1507	1508	1510	1509			
1225-	CSHEAR	1640	11640	1601	1602	1607	1606			
1226-	CSHEAR	1641	11641	1602	1603	1608	1607			
1227-	CSHEAR	1642	11642	1603	1604	1609	1608			
1228-	CSHEAR	1643	11643	1604	1605	1610	1609			
1229-	CSHEAR	1644	11644	1609	1610	1612	1611			
1230-	CSHEAR	1645	11645	1611	1612	1614	1613			
1231-	CSHEAR	1646	11646	1613	1614	1616	1615			
1232-	CSHEAR	1647	11647	1615	1616	1618	1617			
1233-	CSHEAR	1740	11740	1701	1702	1707	1706			
1234-	CSHEAR	1741	11741	1702	1703	1708	1707			
1235-	CSHEAR	1742	11742	1703	1704	1709	1708			
1236-	CSHEAR	1743	11743	1704	1705	1710	1709			
1237-	CSHEAR	1744	11744	1709	1710	1712	1711			
1238-	CSHEAR	1745	11745	1711	1712	1714	1713			
1239-	CSHEAR	1746	11746	1713	1714	1716	1715			
1240-	CSHEAR	1747	11747	1715	1716	1718	1717			
1241-	CSHEAR	1860	11860	1801	1802	1808	1807			
1242-	CSHEAR	1861	11861	1802	1803	1809	1808			
1243-	CSHEAR	1862	11862	1803	1804	1810	1809			
1244-	CSHEAR	1863	11863	1804	1805	1811	1810			
1245-	CSHEAR	1864	11864	1805	1806	1812	1811			
1246-	CSHEAR	1865	11865	1811	1812	1814	1813			
1247-	CSHEAR	1866	11866	1813	1814	1817	1815			
1248-	CSHEAR	1867	11867	1815	1817	1820	1818			
1249-	CSHEAR	1868	11868	1818	1819	1823	1822			
1250-	CSHEAR	1869	11869	1819	1820	1824	1823			



PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O											
CARD	COUNT	1	2	3	4	5	6	7	8	9	10
1251-	CSHEAR	1870	11870	1821	1822	1826	1825				
1252-	CSHEAR	1871	11871	1822	1823	1827	1826				
1253-	CSHEAR	1872	11872	1823	1824	1828	1827				
1254-	CSHEAR	1873	11873	1826	1827	1831	1830				
1255-	CSHEAR	1874	11874	1827	1828	1832	1831				
1256-	CSHEAR	1875	11875	1829	1830	1834	1833				
1257-	CSHEAR	1876	11876	1830	1831	1835	1834				
1258-	CSHEAR	1877	11877	1831	1832	1836	1835				
1259-	CSHEAR	1878	11878	1833	1834	1838	1837				
1260-	CSHEAR	1879	11879	1834	1835	1836	1838				
1261-	CSHEAR	1940	11940	1901	1902	1907	1906				
1262-	CSHEAR	1941	11941	1902	1903	1908	1907				
1263-	CSHEAR	1942	11942	1903	1904	1909	1908				
1264-	CSHEAR	1943	11943	1906	1907	1911	1910				
1265-	CSHEAR	1944	11944	1908	1909	1913	1912				
1266-	CSHEAR	1945	11945	1910	1911	1915	1914				
1267-	CSHEAR	1946	11946	1911	1912	1916	1915				
1268-	CSHEAR	1947	11947	1912	1913	1917	1916				
1269-	CSHEAR	1948	11948	1904	1905	1918	1917				
1270-	CSHEAR	2630	12630	901	1001	1011	911				
1271-	CSHEAR	2631	12631	1001	1101	1111	1011				
1272-	CSHEAR	2632	12632	1101	1151	1162	1111				
1273-	CSHEAR	2633	12633	1151	1201	1221	1162				
1274-	CSHEAR	2634	12634	1201	1301	1306	1206				
1275-	CSHEAR	2635	12635	1301	1401	1406	1321				
1276-	CSHEAR	2636	12636	1401	1511	1516	1406				
1277-	CSHEAR	2637	12637	1511	1601	1606	1516				
1278-	CSHEAR	2638	12638	1601	1651	1661	1606				
1279-	CSHEAR	2639	12639	1651	1701	1706	1661				
1280-	CSHEAR	2640	12640	1701	1721	1722	1706				
1281-	CSHEAR	2641	12641	1721	1802	1808	1722				
1282-	CSHEAR	2646	12634	1206	1306	1321	1221				
1283-	CSHEAR	2699	12640	1721	1722	1724	1723				
1284-	CSHEAR	2706	12706	1934	2026	2011	1936				
1285-	CSHEAR	2707	12707	1933	2029	2014	1935				
1286-	CSHEAR	2708	12708	2011	2014	1935	1936				
1287-	CTRMEM	180	10180	123	124	126	0.0				
1288-	CTRMEM	297	10297	221	222	225	0.0				
1289-	CTRMEM	2067	12067	2034	2035	2039	0.0				
1290-	CTRMEM	2070	12070	2038	2039	2042	0.0				
1291-	CTRMEM	2278	12278	1701	1702	1802	0.0				
1292-	CTRMEM	2620	12620	1707	1808	1706	0.0				
1293-	CTRMEM	2645	12620	1321	1407	1406	.0				
1294-	DMI	CPAJC	0	2	1	2		1		1	
1295-	DMI	CPAJC	1	1	1.0						
1296-	DMI	EQR	0	2	1	2		3		3	
1297-	DMI	EQR	1	1	.06105	.99813	-65.1656				
1298-	DMI	EQR	2	1	.99813	-.06105	55.5034				
1299-	DMI	EQR	3	2	1.0	-166.5					
1300-	EIGR	1	INV	.0	200.	6	6			1.-3	6EIG2

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

SORTED BULK DATA ECHO											
CARD	COUNT	1	2	3	4	5	6	7	8	9	10
1301-	EEIG2	MAX									
1302-	GRID	*101		0		46.7500		.0		E15001	
1303-	*15001		50.3000	0							
1304-	GRID	*102		0		46.7500		-1.6757		E15002	
1305-	*15002		50.3000	0							
1306-	GRID	*103		0		46.7500		-4.2686		E15003	
1307-	*15003		50.3000	0							
1308-	GRID	*104		0		46.7500		-7.4000		E15004	
1309-	*15004		50.3000	0							
1310-	GRID	*105		0		46.7500		-9.2784		E15005	
1311-	*15005		51.2177	0							
1312-	GRID	*106		0		46.7500		.0		E15006	
1313-	*15006		53.4909	0							
1314-	GRID	*107		0		46.7500		-1.6836		E15007	
1315-	*15007		53.4987	0							
1316-	GRID	*108		0		46.7500		-4.2765		E15008	
1317-	*15008		53.5007	0							
1318-	GRID	*109		0		46.7500		-7.4079		E15009	
1319-	*15009		53.5114	0							
1320-	GRID	*110		0		46.7500		-11.0000		E15010	
1321-	*15010		53.5286	0							
1322-	GRID	*111		0		46.7500		.0		E15011	
1323-	*15011		56.7000	0							
1324-	GRID	*112		0		46.7500		-1.6526		E15012	
1325-	*15012		56.7000	0							
1326-	GRID	*113		0		46.7500		-4.2651		E15013	
1327-	*15013		56.7000	0							
1328-	GRID	*114		0		46.7500		-7.3568		E15014	
1329-	*15014		56.7000	0							
1330-	GRID	*115		0		46.7500		-11.0000		E15015	
1331-	*15015		56.7000	0							
1332-	GRID	*116		0		46.7500		.0		E15016	
1333-	*15016		59.8140	0							
1334-	GRID	*117		0		46.7500		-1.6614		E15017	
1335-	*15017		59.8012	0							
1336-	GRID	*118		0		46.7500		-4.2743		E15018	
1337-	*15018		59.8036	0							
1338-	GRID	*119		0		46.7500		-7.4259		E15019	
1339-	*15019		59.7947	0							
1340-	GRID	*120		0		46.7500		-11.0000		E15020	
1341-	*15020		59.7917	0							
1342-	GRID	*121		0		46.7500		.0		E15021	
1343-	*15021		61.7486	0							
1344-	GRID	*122		0		46.7500		-1.6661		E15022	
1345-	*15022		61.9758	0							
1346-	GRID	*123		0		46.7500		-3.4575		E15023	
1347-	*15023		62.2045	0							
1348-	GRID	*124		0		46.7500		-7.4380		E15024	
1349-	*15024		62.7470	0							
1350-	GRID	*125		0		46.7500		-10.0940		E15025	

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S C R T E D B U L K D A T A E C H O										
CARD	1	2	3	4	5	6	7	8	9	10
COUNT	1	2	3	4	5	6	7	8	9	10
1351- *15025			63.3500 0							
1352- GRID *126			0		46.7500		-5.0116		€15026	
1353- *15026			64.7821 0							
1354- GRID *127			0		46.7500		-7.0000		€15027	
1355- *15027			66.7757 0							
1356- GRID *128			0		46.7500		-3.4€38		€15028	
1357- *15028			67.3699 0							
1358- GRID *129			0		46.7500		-3.9€49		€15029	
1359- *15029			68.4550 0							
1360- GRID *130			0		46.7500		.0		€15030	
1361- *15030			67.7724 0							
1362- GRID *131			0		46.7500		.0		€15031	
1363- *15031			69.1287 0							
1364- GRID *151			0		55.3750		.0		€15032	
1365- *15032			49.4750 0							
1366- GRID *152			0		55.3750		-1.70€1		€15033	
1367- *15033			49.4750 0							
1368- GRID *153			0		55.3750		-4.3000		€15034	
1369- *15034			49.4750 0							
1370- GRID *154			0		55.3750		-7.4000		€15035	
1371- *15035			49.4750 0							
1372- GRID *155			0		55.3750		-10.2000		€15036	
1373- *15036			49.9250 0							
1374- GRID *156			0		55.3750		-11.7500		€15037	
1375- *15037			51.0750 0							
1376- GRID *157			0		55.3750		-11.7500		€15038	
1377- *15038			53.9960 0							
1378- GRID *158			0		55.3750		-11.7500		€15039	
1379- *15039			56.7000 0							
1380- GRID *159			0		55.3750		-11.7500		€15040	
1381- *15040			59.2465 0							
1382- GRID *160			0		55.3750		-11.7500		€15041	
1383- *15041			61.1459 0							
1384- GRID *161			0		55.3750		-10.€742		€15042	
1385- *15042			65.3167 0							
1386- GRID *162			0		55.3750		-7.91€4		€15043	
1387- *15043			69.0944 0							
1388- GRID *163			0		55.3750		-4.3917		€15044	
1389- *15044			71.3092 0							
1390- GRID *164			0		55.3750		.0		€15045	
1391- *15045			72.1000 0							
1392- GRID *165			0		55.3750		.0		€15046	
1393- *15046			53.0750 0							
1394- GRID *166			0		55.3750		.0		€15047	
1395- *15047			56.7000 0							
1396- GRID *167			0		55.3750		-7.4000		€15048	
1397- *15048			56.7000 0							
1398- GRID *168			0		55.3750		-4.3000		€15049	
1399- *15049			56.7000 0							
1400- GRID 169			0	55.375	-1.7	56.7	0			

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O										
CARD	1	2	3	4	5	6	7	8	9	10
COUNT .	1	..	2	..	3	..	4	..	5	..
1401- GRID	*201					64.0000		.0		E15050
1402- #15050			48.6500	0						
1403- GRID	*202			0		64.0000		-1.6829		E15051
1404- #15051			48.6500	0						
1405- GRID	*203			0		64.0000		-4.2673		E15052
1406- #15052			48.6500	0						
1407- GRID	*204			0		64.0000		-7.3920		E15053
1408- #15053			48.6500	0						
1409- GRID	*205			0		64.0000		-10.4767		E15054
1410- #15054			48.6500	0						
1411- GRID	*206			0		64.0000		-12.5000		E15055
1412- #15055			48.6500	0						
1413- GRID	*207			0		64.0000		.0		E15056
1414- #15056			52.5961	0						
1415- GRID	*208			0		64.0000		-1.6731		E15057
1416- #15057			52.6058	0						
1417- GRID	*209			0		64.0000		-4.2771		E15058
1418- #15058			52.6116	0						
1419- GRID	*210			0		64.0000		-7.3621		E15059
1420- #15059			52.6059	0						
1421- GRID	*211			0		64.0000		-10.4669		E15060
1422- #15060			52.6206	0						
1423- GRID	*212			0		64.0000		-12.5000		E15061
1424- #15061			52.5961	0						
1425- GRID	*213			0		64.0000		.0		E15062
1426- #15062			53.8978	0						
1427- GRID	*214			0		64.0000		-1.6698		E15063
1428- #15063			53.9278	0						
1429- GRID	*215			0		64.0000		-4.2742		E15064
1430- #15064			53.9136	0						
1431- GRID	*216			0		64.0000		-7.3789		E15065
1432- #15065			53.9283	0						
1433- GRID	*217			0		64.0000		-10.4836		E15066
1434- #15066			53.9430	0						
1435- GRID	*218			0		64.0000		-12.5000		E15067
1436- #15067			53.9382	0						
1437- GRID	*219			0		64.0000		.0		E15068
1438- #15068			56.7000	0						
1439- GRID	*220			0		64.0000		-1.6622		E15069
1440- #15069			56.7000	0						
1441- GRID	*221			0		64.0000		-4.2863		E15070
1442- #15070			56.7000	0						
1443- GRID	*222			0		64.0000		-7.3913		E15071
1444- #15071			56.7000	0						
1445- GRID	*223			0		64.0000		-10.4756		E15072
1446- #15072			56.7000	0						
1447- GRID	*224			0		64.0000		-12.5000		E15073
1448- #15073			56.7000	0						
1449- GRID	*225			0		64.0000		-7.4252		E15074
1450- #15074			59.2577	0						

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D B U L K C A T A E C H O										
CARD	1	2	3	4	5	6	7	8	9	10
1451- GRID	*226		0			64.0000		-10.4705		E15075
1452- *15075			59.2312	0						
1453- GRID	*227		0			64.0000		-12.5000		E15076
1454- *15076			59.2465	0						
1455- GRID	*228		0			64.0000		-8.4512		E15077
1456- *15077			62.4208	0						
1457- GRID	*229		0			64.0000		-10.5000		E15078
1458- *15078			62.5000	0						
1459- GRID	*230		0			64.0000		-12.5000		E15079
1460- *15079			62.5000	0						
1461- GRID	*231		0			64.0000		-7.8125		E15080
1462- *15080			65.6548	0						
1463- GRID	*232		0			64.0000		-9.7007		E15081
1464- *15081			66.5181	0						
1465- GRID	*233		0			64.0000		-11.5485		E15082
1466- *15082			67.2835	0						
1467- GRID	*234		0			64.0000		-5.9811		E15083
1468- *15083			68.4469	0						
1469- GRID	*235		0			64.0000		-7.4247		E15084
1470- *15084			69.9247	0						
1471- GRID	*236		0			64.0000		-8.8389		E15085
1472- *15085			71.3389	0						
1473- GRID	*237		0			64.0000		-3.2648		E15086
1474- *15086			70.2620	0						
1475- GRID	*238		0			64.0000		-4.0181		E15087
1476- *15087			72.2007	0						
1477- GRID	*239		0			64.0000		-4.7835		E15088
1478- *15088			74.0485	0						
1479- GRID	*240		0			64.0000		.0		E15089
1480- *15089			70.9247	0						
1481- GRID	*241		0			64.0000		.0		E15090
1482- *15090			73.0000	0						
1483- GRID	*242		0			64.0000		.0		E15091
1484- *15091			75.0000	0						
1485- GRID	*301		0			68.2500		.0		E15092
1486- *15092			48.4320	1						
1487- GRID	*302		0			68.2500		-1.7054		E15093
1488- *15093			48.4320	0						
1489- GRID	*303		0			68.2500		-4.3339		E15094
1490- *15094			48.4320	0						
1491- GRID	*304		0			68.2500		-7.0226		E15095
1492- *15095			48.4320	0						
1493- GRID	*305		0			68.2500		-12.5000		E15096
1494- *15096			48.4320	0						
1495- GRID	*306		0			68.2500		.0		E15097
1496- *15097			52.4251	0						
1497- GRID	*307		0			68.2500		-1.7144		E15098
1498- *15098			52.4267	0						
1499- GRID	*308		0			68.2500		-4.3428		E15099
1500- *15099			52.4203	0						

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

SORTED BULK DATA ECHO										
CARD	1	2	3	4	5	6	7	8	9	10
COUNT.	..	..	..	..	..	..	..	..	..	..
1501- GRID	*309		0			68.2500		-8.1150		£15100
1502- *15100			52.4086	0						
1503- GRID	*310		0			68.2500		-12.5000		£15101
1504- *15101			52.4051	0						
1505- GRID	*311		0			68.2500		-8.5561		£15102
1506- *15102			53.9993	0						
1507- GRID	*312		0			68.2500		-12.5000		£15103
1508- *15103			53.9902	0						
1509- GRID	*313		0			68.2500		-9.3238		£15104
1510- *15104			56.7178	0						
1511- GRID	*314		0			68.2500		-12.5000		£15105
1512- *15105			56.6989	0						
1513- GRID	*315		0			68.2500		-10.0320		£15106
1514- *15106			59.3754	0						
1515- GRID	*316		0			68.2500		-12.5000		£15107
1516- *15107			59.3678	0						
1517- GRID	*317		0			68.2500		-10.8750		£15108
1518- *15108			62.5000	0						
1519- GRID	*318		0			68.2500		-12.5000		£15109
1520- *15109			62.5000	0						
1521- GRID	*401		0			68.2500		.0		£15110
1522- *15110			48.4320	1						
1523- GRID	*406		0			68.2500		.0		£15111
1524- *15111			52.4186	0						
1525- GRID	*407		0			68.2500		-1.7540		£15112
1526- *15112			52.3976	0						
1527- GRID	*408		0			68.2500		-4.3177		£15113
1528- *15113			52.4151	0						
1529- GRID	*409		0			68.2500		-7.0225		£15114
1530- *15114			52.3956	0						
1531- GRID	*501		0			78.0000		.0		£15115
1532- *15115			47.9330	0						
1533- GRID	*502		0			78.0000		-1.6881		£15116
1534- *15116			47.9330	0						
1535- GRID	*503		0			78.0000		-4.2606		£15117
1536- *15117			47.9330	0						
1537- GRID	*504		0			78.0000		-6.8931		£15118
1538- *15118			47.9330	0						
1539- GRID	*505		0			78.0000		-12.5000		£15119
1540- *15119			47.9330	0						
1541- GRID	*506		0			78.0000		.0		£15120
1542- *15120			51.9330	0						
1543- GRID	*507		0			78.0000		-1.6827		£15121
1544- *15121			51.9336	0						
1545- GRID	*508		0			78.0000		-4.2853		£15122
1546- *15122			51.9241	0						
1547- GRID	*509		0			78.0000		-7.9433		£15123
1548- *15123			51.9633	0						
1549- GRID	*510		0			78.0000		-12.5000		£15124
1550- *15124			51.9321	0						

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O																				
CARD	COUNT.	1	..	2	..	3	..	4	..	5	..	6	..	7	..	8	..	9	..	10
1551- GRID	*511						0					78.0000				-2.5093			£15125	
1552- *15125						54.0470	0													
1553- GRID	*512						0					78.0000				-12.5000			£15126	
1554- *15126						54.0226	0													
1555- GRID	*513						0					78.0000				-9.2431			£15127	
1556- *15127						56.7517	0													
1557- GRID	*514						0					78.0000				-12.5000			£15128	
1558- *15128						56.7555	0													
1559- GRID	*515						0					78.0000				-9.9562			£15129	
1560- *15129						59.3965	0													
1561- GRID	*516						0					78.0000				-12.5000			£15130	
1562- *15130						59.4285	0													
1563- GRID	*517						0					78.0000				-10.7751			£15131	
1564- *15131						62.5223	0													
1565- GRID	*518						0					78.0000				-12.5000			£15132	
1566- *15132						62.5000	0													
1567- GRID	*601						0					87.5000				.0			£15133	
1568- *15133						47.4460	0													
1569- GRID	*602						0					87.5000				-1.7202			£15134	
1570- *15134						47.4460	0													
1571- GRID	*603						0					87.5000				-4.3001			£15135	
1572- *15135						47.4460	0													
1573- GRID	*604						0					87.5000				-6.7200			£15136	
1574- *15136						47.4460	0													
1575- GRID	*605						0					87.5000				-12.5000			£15137	
1576- *15137						47.4460	0													
1577- GRID	*606						0					87.5000				.0			£15138	
1578- *15138						51.4458	0													
1579- GRID	*607						0					87.5000				-1.7297			£15139	
1580- *15139						51.4364	0													
1581- GRID	*608						0					87.5000				-4.2897			£15140	
1582- *15140						51.4415	0													
1583- GRID	*609						0					87.5000				-7.7896			£15141	
1584- *15141						51.4431	0													
1585- GRID	*610						0					87.5000				-12.5000			£15142	
1586- *15142						51.4458	0													
1587- GRID	*611						0					87.5000				-8.5012			£15143	
1588- *15143						54.1956	0													
1589- GRID	*612						0					87.5000				-12.5000			£15144	
1590- *15144						54.1856	0													
1591- GRID	*613						0					87.5000				-9.2334			£15145	
1592- *15145						56.9085	0													
1593- GRID	*614						0					87.5000				-12.5000			£15146	
1594- *15146						56.8858	0													
1595- GRID	*615						0					87.5000				-9.9471			£15147	
1596- *15147						59.5410	0													
1597- GRID	*616						0					87.5000				-12.5000			£15148	
1598- *15148						59.5657	0													
1599- GRID	*617						0					87.5000				-10.7519			£15149	
1600- *15149						62.6759	0													

PHASE 1(SYN.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O										
CARD	1	2	3	4	5	6	7	8	9	10
CDUNT.	..	..	..	..	..	..	..	..	..	..
1601- GRID	*618		0			87.5000		-12.5000		615150
1602- *15150		62.5000	0							
1603- GRID	*701		0			97.0000		.0		615151
1604- *15151		46.9600	0							
1605- GRID	*702		0			97.0000		-1.6655		615152
1606- *15152		46.9600	0							
1607- GRID	*703		0			97.0000		-4.2938		615153
1608- *15153		46.9600	0							
1609- GRID	*704		0			97.0000		-6.6413		615154
1610- *15154		46.9600	0							
1611- GRID	*705		0			97.0000		-12.5000		615155
1612- *15155		46.9600	0							
1613- GRID	*706		0			97.0000		.0		615156
1614- *15156		50.9729	0							
1615- GRID	*707		0			97.0000		-1.6575		615157
1616- *15157		50.9796	0							
1617- GRID	*708		0			97.0000		-4.3061		615158
1618- *15158		50.9985	0							
1619- GRID	*709		0			97.0000		-7.6570		615159
1620- *15159		51.0114	0							
1621- GRID	*710		0			97.0000		-12.5000		615160
1622- *15160		51.0130	0							
1623- GRID	*711		0			97.0000		-8.4841		615161
1624- *15161		54.0749	0							
1625- GRID	*712		0			97.0000		-12.5000		615162
1626- *15162		54.1030	0							
1627- GRID	*713		0			97.0000		-9.2284		615163
1628- *15163		56.8177	0							
1629- GRID	*714		0			97.0000		-12.5000		615164
1630- *15164		56.8116	0							
1631- GRID	*715		0			97.0000		-9.9318		615165
1632- *15165		59.4605	0							
1633- GRID	*716		0			97.0000		-12.5000		615166
1634- *15166		59.4802	0							
1635- GRID	*717		0			97.0000		-10.7593		615167
1636- *15167		62.5638	0							
1637- GRID	*718		0			97.0000		-12.5000		615168
1638- *15168		62.5000	0							
1639- GRID	*751		0			102.1200		.0		615169
1640- *15169		46.6975	0							
1641- GRID	*752		0			102.1200		-1.7051		615170
1642- *15170		46.6975	0							
1643- GRID	*753		0			102.1200		-4.3000		615171
1644- *15171		46.6975	0							
1645- GRID	*754		0			102.1200		-6.5709		615172
1646- *15172		46.6975	0							
1647- GRID	*755		0			102.1200		-12.5000		615173
1648- *15173		46.6975	0							
1649- GRID	*756		0			102.1200		-12.5000		615174
1650- *15174		50.6975	0							



PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D B U L K D A T A E C H D										
CARD	1	2	3	4	5	6	7	8	9	10
COUNT	1	2	3	4	5	6	7	8	9	10
1651- GRID	*757		0			102.1200		-12.5000		615175
1652- *15175		53.9960	0							
1653- GRID	*758		0			102.1200		-12.5000		615176
1654- *15176		56.7000	0							
1655- GRID	*759		0			102.1200		-12.5000		615177
1656- *15177		59.3750	0							
1657- GRID	*760		0			102.1200		-12.5000		615178
1658- *15178		62.5000	0							
1659- GRID	*801		0			106.5000		.0		615179
1660- *15179		46.4730	0							
1661- GRID	*802		0			106.5000		-1.7001		615180
1662- *15180		46.4730	0							
1663- GRID	*803		0			106.5000		-4.3001		615181
1664- *15181		46.4730	0							
1665- GRID	*804		0			106.5000		-6.5200		615182
1666- *15182		46.4730	0							
1667- GRID	*805		0			106.5000		-12.5000		615183
1668- *15183		46.4730	0							
1669- GRID	*806		0			106.5000		.0		615184
1670- *15184		50.4730	0							
1671- GRID	*807		0			106.5000		-1.7191		615185
1672- *15185		50.4447	0							
1673- GRID	*808		0			106.5000		-4.2591		615186
1674- *15186		50.4523	0							
1675- GRID	*809		0			106.5000		-7.5551		615187
1676- *15187		50.4565	0							
1677- GRID	*810		0			106.5000		-12.5000		615188
1678- *15188		50.4530	0							
1679- GRID	*811		0			106.5000		-8.5761		615189
1680- *15189		53.9918	0							
1681- GRID	*812		0			106.5000		-12.5000		615190
1682- *15190		53.9929	0							
1683- GRID	*813		0			106.5000		-9.3093		615191
1684- *15191		56.7483	0							
1685- GRID	*814		0			106.5000		-12.5000		615192
1686- *15192		56.7328	0							
1687- GRID	*815		0			106.5000		-10.0219		615193
1688- *15193		59.3649	0							
1689- GRID	*816		0			106.5000		-12.5000		615194
1690- *15194		59.3527	0							
1691- GRID	*817		0			106.5000		-10.8767		615195
1692- *15195		62.4608	0							
1693- GRID	*818		0			106.5000		-12.5000		615196
1694- *15196		62.5000	0							
1695- GRID	*901		0			116.0000		.0		615197
1696- *15197		45.9860	0							
1697- GRID	*902		0			116.0000		-1.7199		615198
1698- *15198		45.9860	0							
1699- GRID	*903		0			116.0000		-4.3200		615199
1700- *15199		45.9860	0							

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D B U L K D A T A E C H O										
CARD	1	2	3	4	5	6	7	8	9	10
1701- GRID	*904		0			116.0000		-6.4000		615200
1702- *15200		45.9860	0							
1703- GRID	*905		0			116.0000		-12.5000		615201
1704- *15201		45.9860	0							
1705- GRID	*910		0			116.0000		-12.5000		615202
1706- *15202		49.9860	0							
1707- GRID	*911		0			116.0000		.0		615203
1708- *15203		51.5000	0							
1709- GRID	*912		0			116.0000		-1.7576		615204
1710- *15204		51.5000	0							
1711- GRID	*913		0			116.0000		-4.3176		615205
1712- *15205		51.5000	0							
1713- GRID	*914		0			116.0000		-7.2776		615206
1714- *15206		51.5000	0							
1715- GRID	*915		0			116.0000		-12.5000		615207
1716- *15207		51.5000	0							
1717- GRID	*916		0			116.0000		-8.5656		615208
1718- *15208		53.9786	0							
1719- GRID	*917		0			116.0000		-12.5000		615209
1720- *15209		53.9659	0							
1721- GRID	*918		0			116.0000		-9.2460		615210
1722- *15210		56.7000	0							
1723- GRID	*919		0			116.0000		-12.5000		615211
1724- *15211		56.7000	0							
1725- GRID	*920		0			116.0000		-10.0431		615212
1726- *15212		59.4539	0							
1727- GRID	*921		0			116.0000		-12.5000		615213
1728- *15213		59.4458	0							
1729- GRID	*922		0			116.0000		-10.8527		615214
1730- *15214		62.4512	0							
1731- GRID	*923		0			116.0000		-12.5000		615215
1732- *15215		62.5000	0							
1733- GRID	*1001		0			119.0000		.0		615216
1734- *15216		45.8330	0							
1735- GRID	*1002		0			119.0000		-1.7227		615217
1736- *15217		45.8330	0							
1737- GRID	*1003		0			119.0000		-4.2668		615218
1738- *15218		45.8330	0							
1739- GRID	*1004		0			119.0000		-6.3301		615219
1740- *15219		45.8330	0							
1741- GRID	*1005		0			119.0000		-12.5000		615220
1742- *15220		45.8330	0							
1743- GRID	*1010		0			119.0000		-12.5000		615221
1744- *15221		49.8330	0							
1745- GRID	*1011		0			119.0000		.0		615222
1746- *15222		51.5000	0							
1747- GRID	*1012		0			119.0000		-1.7317		615223
1748- *15223		51.5000	0							
1749- GRID	*1013		0			119.0000		-4.2958		615224
1750- *15224		51.5000	0							

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O																				
CARD	COUNT	1	..	2	..	3	..	4	..	5	..	6	..	7	..	8	..	9	..	10
1751- GRID	*1014						0					119.0000			-7.8816					815225
1752- *15225						51.5000	0													
1753- GRID	*1015						0					119.0000			-12.5000					815226
1754- *15226						51.5000	0													
1755- GRID	*1016						0					119.0000			-8.5667					815227
1756- *15227						53.9523	0													
1757- GRID	*1017						0					119.0000			-12.5000					815228
1758- *15228						53.9459	0													
1759- GRID	*1018						0					119.0000			-9.2480					815229
1760- *15229						56.7000	0													
1761- GRID	*1019						0					119.0000			-12.5000					815230
1762- *15230						56.7000	0													
1763- GRID	*1020						0					119.0000			-10.0176					815231
1764- *15231						59.2985	0													
1765- GRID	*1021						0					119.0000			-12.5000					815232
1766- *15232						59.3145	0													
1767- GRID	*1022						0					119.0000			-10.8639					815233
1768- *15233						62.4221	0													
1769- GRID	*1023						0					119.0000			-12.5000					815234
1770- *15234						62.5000	0													
1771- GRID	*1101						0					125.5000			.0					815235
1772- *15235						45.5000	0													
1773- GRID	*1102						0					125.5000			-1.7172					815236
1774- *15236						45.5000	0													
1775- GRID	*1103						0					125.5000			-4.2931					815237
1776- *15237						45.5000	0													
1777- GRID	*1104						0					125.5000			-6.2499					815238
1778- *15238						45.5000	0													
1779- GRID	*1105						0					125.5000			-12.5000					815239
1780- *15239						45.5000	0													
1781- GRID	*1110						0					125.5000			-12.5000					815241
1782- *15241						49.5000	0													
1783- GRID	*1111						0					125.5000			.0					815242
1784- *15242						51.5000	0													
1785- GRID	*1112						0					125.5000			-1.7553					815243
1786- *15243						51.5000	0													
1787- GRID	*1113						0					125.5000			-4.3311					815244
1788- *15244						51.5000	0													
1789- GRID	*1114						0					125.5000			-7.8654					815245
1790- *15245						51.5000	0													
1791- GRID	*1115						0					125.5000			-12.5000					815246
1792- *15246						51.5000	0													
1793- GRID	*1116						0					125.5000			-8.5805					815247
1794- *15247						53.9715	0													
1795- GRID	*1117						0					125.5000			-12.5000					815248
1796- *15248						53.9662	0													
1797- GRID	*1118						0					125.5000			-9.3168					815249
1798- *15249						56.7024	0													
1799- GRID	*1119						0					125.5000			-12.5000					815250
1800- *15250						56.6818	0													

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

SORTED BULK DATA ECHO

CARD	COUNT	1	2	3	4	5	6	7	8	9	10
1801- GRID	*1120			0			125.5000		-10.0525		615251
1802- *15251			59.3335	0							
1803- GRID	*1121			0			125.5000		-12.5000		615252
1804- *15252			59.3176	0							
1805- GRID	*1122			0			125.5000		-10.9111		615253
1806- *15253			62.4630	0							
1807- GRID	*1123			0			125.5000		-12.5000		615254
1808- *15254			62.5000	0							
1809- GRID	*1151			0			129.0000		.0		615255
1810- *15255			45.5000	0							
1811- GRID	*1152			0			129.0000		-1.7051		615256
1812- *15256			45.5000	0							
1813- GRID	*1153			0			129.0000		-4.3000		615257
1814- *15257			45.5000	0							
1815- GRID	*1154			0			129.0000		-6.2500		615258
1816- *15258			45.5000	0							
1817- GRID	*1155			0			129.0000		-12.5000		615259
1818- *15259			45.5000	0							
1819- GRID	*1156			0			129.0000		-12.5000		615260
1820- *15260			49.5000	0							
1821- GRID	*1157			0			129.0000		-12.5000		615261
1822- *15261			51.5000	0							
1823- GRID	*1158			0			129.0000		-12.5000		615262
1824- *15262			53.9960	0							
1825- GRID	*1159			0			129.0000		-12.5000		615263
1826- *15263			56.7000	0							
1827- GRID	*1160			0			129.0000		-12.5000		615264
1828- *15264			59.3750	0							
1829- GRID	*1161			0			129.0000		-12.5000		615265
1830- *15265			62.5000	0							
1831- GRID	*1162			0			129.0000		.0		615266
1832- *15266			51.5000	0							
1833- GRID	*1201			0			135.0000		.0		615267
1834- *15267			45.5000	0							
1835- GRID	*1202			0			135.0000		-1.7800		615268
1836- *15268			45.5000	0							
1837- GRID	*1203			0			135.0000		-4.3201		615269
1838- *15269			45.5000	0							
1839- GRID	*1204			0			135.0000		-6.3001		615270
1840- *15270			45.5000	0							
1841- GRID	*1205			0			135.0000		-12.5000		615271
1842- *15271			45.5000	0							
1843- GRID	*1206			0			135.0000		.0		615272
1844- *15272			49.5000	0							
1845- GRID	*1207			0			135.0000		-1.7728		615273
1846- *15273			49.5000	0							
1847- GRID	*1208			0			135.0000		-4.3527		615274
1848- *15274			49.5000	0							
1849- GRID	*1209			0			135.0000		-7.3528		615275
1850- *15275			49.5000	0							

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O										
CARD	1	2	3	4	5	6	7	8	9	10
COUNT.	1	2	3	4	5	6	7	8	9	10
1851- GRID	*1210		0			135.0000		-12.5000		615276
1852- *15276			49.5000	0						
1853- GRID	*1211		0			135.0000		-7.9193		615277
1854- *15277			51.5000	0						
1855- GRID	*1212		0			135.0000		-12.5000		615278
1856- *15278			51.5000	0						
1857- GRID	*1213		0			135.0000		-8.5672		615279
1858- *15279			53.9925	0						
1859- GRID	*1214		0			135.0000		-12.5000		615280
1860- *15280			53.9799	0						
1861- GRID	*1215		0			135.0000		-9.2959		615281
1862- *15281			56.7102	0						
1863- GRID	*1216		0			135.0000		-12.5000		615282
1864- *15282			56.7198	0						
1865- GRID	*1217		0			135.0000		-10.0244		615283
1866- *15283			59.3679	0						
1867- GRID	*1218		0			135.0000		-12.5000		615284
1868- *15284			59.3398	0						
1869- GRID	*1219		0			135.0000		-10.8543		615285
1870- *15285			62.4852	0						
1871- GRID	*1220		0			135.0000		-12.5000		615286
1872- *15286			62.5000	0						
1873- GRID	*1221		0			135.0000		.0		615287
1874- *15287			51.5000	0						
1875- GRID	*1301		0			141.7500		-0.0000		615288
1876- *15288			45.5000	0						
1877- GRID	*1302		0			141.7500		-1.7201		615289
1878- *15289			45.5000	0						
1879- GRID	*1303		0			141.7500		-4.2803		615290
1880- *15290			45.5000	0						
1881- GRID	*1304		0			141.7500		-6.2200		615291
1882- *15291			45.5000	0						
1883- GRID	*1305		0			141.7500		-12.5000		615292
1884- *15292			45.5000	0						
1885- GRID	*1306		0			141.7500		.0000		615293
1886- *15293			49.5000	0						
1887- GRID	*1307		0			141.7500		-1.7173		615294
1888- *15294			49.5000	0						
1889- GRID	*1308		0			141.7500		-4.2971		615295
1890- *15295			49.5000	0						
1891- GRID	*1309		0			141.7500		-7.3172		615296
1892- *15296			49.5000	0						
1893- GRID	*1310		0			141.7500		-12.5000		615297
1894- *15297			49.5000	0						
1895- GRID	*1311		0			141.7500		-7.8558		615298
1896- *15298			51.5000	0						
1897- GRID	*1312		0			141.7500		-12.5000		615299
1898- *15299			51.5000	0						
1899- GRID	*1313		0			141.7500		-8.5435		615300
1900- *15300			54.0160	0						

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

SORTED BULK DATA ECHO											
CARD	COUNT	1	2	3	4	5	6	7	8	9	10
1901- GRID	*1314			0			141.7500		-12.5000		615301
1902- *15301			54.0195	0							
1903- GRID	*1315			0			141.7500		-9.2480		615302
1904- *15302			56.7000	0							
1905- GRID	*1316			0			141.7500		-12.5000		615303
1906- *15303			56.7000	0							
1907- GRID	*1317			0			141.7500		-9.9659		615304
1908- *15304			59.3486	0							
1909- GRID	*1318			0			141.7500		-12.5000		615305
1910- *15305			59.3591	0							
1911- GRID	*1319			0			141.7500		-10.8262		615306
1912- *15306			62.4921	0							
1913- GRID	*1320			0			141.7500		-12.5000		615307
1914- *15307			62.5000	0							
1915- GRID	*1321			0			141.7500		.0		615308
1916- *15308			51.5000	0							
1917- GRID	*1401			0			144.7500		.0		615309
1918- *15309			45.5000	0							
1919- GRID	*1402			0			144.7500		-1.7051		615310
1920- *15310			45.5000	0							
1921- GRID	*1403			0			144.7500		-4.3000		615311
1922- *15311			45.5000	0							
1923- GRID	*1404			0			144.7500		-6.2500		615312
1924- *15312			45.5000	0							
1925- GRID	*1405			0			144.7500		-12.5000		615313
1926- *15313			45.5000	0							
1927- GRID	*1406			0			144.7500		.0000		615314
1928- *15314			51.5000	0							
1929- GRID	*1407			0			144.7500		-1.7051		615315
1930- *15315			51.5000	0							
1931- GRID	*1408			0			144.7500		-4.3000		615316
1932- *15316			51.5000	0							
1933- GRID	*1409			0			144.7500		-7.8560		615317
1934- *15317			51.5000	0							
1935- GRID	*1410			0			144.7500		-12.5000		615318
1936- *15318			51.5000	0							
1937- GRID	*1411			0			144.7500		-8.5506		615319
1938- *15319			54.0569	0							
1939- GRID	*1412			0			144.7500		-12.5000		615320
1940- *15320			54.0337	0							
1941- GRID	*1413			0			144.7500		-9.2480		615321
1942- *15321			56.7000	0							
1943- GRID	*1414			0			144.7500		-12.5000		615322
1944- *15322			56.7000	0							
1945- GRID	*1415			0			144.7500		-9.5791		615323
1946- *15323			59.4427	0							
1947- GRID	*1416			0			144.7500		-12.5000		615324
1948- *15324			59.4426	0							
1949- GRID	*1417			0			144.7500		-10.8098		615325
1950- *15325			62.5343	0							

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O										
CARD	1	2	3	4	5	6	7	8	9	10
1951- GRID	*1418		0			144.7500		-12.5000		E15326
1952- *15326			62.5000	0						
1953- GRID	*1419		0			144.7500		-9.4000		E15327
1954- *15327			51.5000	0						
1955- GRID	*1501		0			150.3750		-7.8560		E15328
1956- *15328			51.5000	0						
1957- GRID	*1502		0			150.3750		-12.5000		E15329
1958- *15329			51.5000	0						
1959- GRID	*1503		0			150.3750		-8.5558		E15330
1960- *15330			54.0337	0						
1961- GRID	*1504		0			150.3750		-12.5000		E15331
1962- *15331			54.0439	0						
1963- GRID	*1505		0			150.3750		-9.2480		E15332
1964- *15332			56.7000	0						
1965- GRID	*1506		0			150.3750		-12.5000		E15333
1966- *15333			56.7000	0						
1967- GRID	*1507		0			150.3750		-9.9939		E15334
1968- *15334			59.3964	0						
1969- GRID	*1508		0			150.3750		-12.5000		E15335
1970- *15335			59.3944	0						
1971- GRID	*1509		0			150.3750		-10.8368		E15336
1972- *15336			62.4944	0						
1973- GRID	*1510		0			150.3750		-12.5000		E15337
1974- *15337			62.5000	0						
1975- GRID	*1511		0			150.3750		.0		E15338
1976- *15338			45.5000	0						
1977- GRID	*1512		0			150.3750		-1.7051		E15339
1978- *15339			45.5000	0						
1979- GRID	*1513		0			150.3750		-4.3000		E15340
1980- *15340			45.5000	0						
1981- GRID	*1514		0			150.3750		-6.2500		E15341
1982- *15341			45.5000	0						
1983- GRID	*1515		0			150.3750		-12.5000		E15342
1984- *15342			45.5000	0						
1985- GRID	*1516		0			150.3750		.0		E15343
1986- *15343			51.5000	0						
1987- GRID	*1517		0			150.3750		-1.7051		E15344
1988- *15344			51.5000	0						
1989- GRID	*1518		0			150.3750		-4.3000		E15345
1990- *15345			51.5000	0						
1991- GRID	*1519		0			150.3750		-9.4000		E15346
1992- *15346			51.5000	0						
1993- GRID	*1601		0			153.3750		-0.0000		E15347
1994- *15347			45.5000	0						
1995- GRID	*1602		0			153.3750		-1.7051		E15348
1996- *15348			45.5000	0						
1997- GRID	*1603		0			153.3750		-4.3000		E15349
1998- *15349			45.5000	0						
1999- GRID	*1604		0			153.3750		-6.2500		E15350
2000- *15350			45.5000	0						

PHASE 1(SYM,CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O										
CARD	1	2	3	4	5	6	7	8	9	10
COUNT.	1	2	3	4	5	6	7	8	9	10
2001- GRID	*1605					153.3750		-12.5000		815351
2002- *15351			45.5000	0						
2003- GRID	*1606			0		153.3750		-0.0000		815352
2004- *15352			51.5000	0						
2005- GRID	*1607			0		153.3750		-1.7051		815353
2006- *15353			51.5000	0						
2007- GRID	*1608			0		153.3750		-4.3000		815354
2008- *15354			51.5000	0						
2009- GRID	*1609			0		153.3750		-7.8560		815355
2010- *15355			51.5000	0						
2011- GRID	*1610			0		153.3750		-12.5000		815356
2012- *15356			51.5000	0						
2013- GRID	*1611			0		153.3750		-8.5302		815357
2014- *15357			53.9960	0						
2015- GRID	*1612			0		153.3750		-12.5000		815358
2016- *15358			53.9960	0						
2017- GRID	*1613			0		153.3750		-9.2480		815359
2018- *15359			56.7000	0						
2019- GRID	*1614			0		153.3750		-12.5000		815360
2020- *15360			56.7000	0						
2021- GRID	*1615			0		153.3750		-9.9410		815361
2022- *15361			59.3813	0						
2023- GRID	*1616			0		153.3750		-12.5000		815362
2024- *15362			59.3750	0						
2025- GRID	*1617			0		153.3750		-10.7792		815363
2026- *15363			62.4747	0						
2027- GRID	*1618			0		153.3750		-12.5000		815364
2028- *15364			62.5000	0						
2029- GRID	*1619			0		153.3750		-5.4000		815365
2030- *15365			51.5000	0						
2031- GRID	*1620			0		153.3750		-9.4000		815366
2032- *15366			51.5000	0						
2033- GRID	*1651			0		157.6875		.0		815367
2034- *15367			45.5000	0						
2035- GRID	*1652			0		157.6875		-1.7051		815368
2036- *15368			45.5000	0						
2037- GRID	*1653			0		157.6875		-4.3000		815369
2038- *15369			45.5000	0						
2039- GRID	*1654			0		157.6875		-6.2500		815370
2040- *15370			45.5000	0						
2041- GRID	*1655			0		157.6875		-12.5000		815371
2042- *15371			45.5000	0						
2043- GRID	*1656			0		157.6875		-12.5000		815372
2044- *15372			51.5000	0						
2045- GRID	*1657			0		157.6875		-12.5000		815373
2046- *15373			53.9960	0						
2047- GRID	*1658			0		157.6875		-12.5000		815374
2048- *15374			56.7000	0						
2049- GRID	*1659			0		157.6875		-12.5000		815375
2050- *15375			59.3750	0						



PHASE I(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O										
CARD	1	2	3	4	5	6	7	8	9	10
2051- GRID	*1660		0			157.6875		-12.5000		£15376
2052- *15376		62.5000	0							
2053- GRID	*1661		0			157.6875		.0		£15377
2054- *15377		51.5000	0							
2055- GRID	*1662		0			157.6875		-1.7051		£15378
2056- *15378		51.5000	0							
2057- GRID	*1663		0			157.6875		-4.3000		£15379
2058- *15379		51.5000	0							
2059- GRID	*1664		0			157.6875		-7.8560		£15380
2060- *15380		51.5000	0							
2061- GRID	*1665		0			157.6875		-9.4000		£15381
2062- *15381		51.5000	0							
2063- GRID	*1701		0			162.0000		.0000		£15382
2064- *15382		45.5000	0							
2065- GRID	*1702		0			162.0000		-1.7051		£15383
2066- *15383		45.5000	0							
2067- GRID	*1703		0			162.0000		-4.3000		£15384
2068- *15384		45.5000	0							
2069- GRID	*1704		0			162.0000		-6.2500		£15385
2070- *15385		45.5000	0							
2071- GRID	*1705		0			162.0000		-12.5000		£15386
2072- *15386		45.5000	0							
2073- GRID	*1706		0			162.0000		.0000		£15387
2074- *15387		51.5000	0							
2075- GRID	*1707		0			162.0000		-1.7051		£15388
2076- *15388		51.5000	0							
2077- GRID	*1708		0			162.0000		-4.3000		£15389
2078- *15389		51.5000	0							
2079- GRID	*1709		0			162.0000		-7.8560		£15390
2080- *15390		51.5000	0							
2081- GRID	*1710		0			162.0000		-12.5000		£15391
2082- *15391		51.5000	0							
2083- GRID	*1711		0			162.0000		-8.5065		£15392
2084- *15392		53.9960	0							
2085- GRID	*1712		0			162.0000		-12.5000		£15393
2086- *15393		53.9960	0							
2087- GRID	*1713		0			162.0000		-9.2337		£15394
2088- *15394		56.7570	0							
2089- GRID	*1714		0			162.0000		-12.5000		£15395
2090- *15395		56.7000	0							
2091- GRID	*1715		0			162.0000		-9.9185		£15396
2092- *15396		59.3983	0							
2093- GRID	*1716		0			162.0000		-12.5000		£15397
2094- *15397		59.3750	0							
2095- GRID	*1717		0			162.0000		-10.7578		£15398
2096- *15398		62.4953	0							
2097- GRID	*1718		0			162.0000		-12.5000		£15399
2098- *15399		62.5000	0							
2099- GRID	*1719		0			162.0000		-9.4000		£15400
2100- *15400		51.5000	0							

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O																				
CARD	COUNT .	1	..	2	..	3	..	4	..	5	..	6	..	7	..	8	..	9	..	10
2101- GRID	*1720					0						162.0000				-9.4000				£15401
2102- *15401						51.5000	0													
2103- GRID	*1721					0						165.2500				-1.2315				£15402
2104- *15402						45.5000	0													
2105- GRID	*1722					0						165.2500				-1.2315				£15403
2106- *15403						51.5000	0													
2107- GRID	*1723					0						165.2500				.0				£15405
2108- *15405						45.5000	0													
2109- GRID	*1724					0						165.2500				.0				£15404
2110- *15404						51.5000	0													
2111- GRID	1800					0		165.25	.0			45.5		1						
2112- GRID	*1801					0						166.5000				.0				£15406
2113- *15406						45.5000	0													
2114- GRID	*1802					0						166.5000				-1.7051				£15407
2115- *15407						45.5000	0													
2116- GRID	*1803					0						166.5000				-4.3000				£15408
2117- *15408						45.5000	0													
2118- GRID	*1804					0						166.5000				-6.2500				£15409
2119- *15409						45.5000	0													
2120- GRID	*1805					0						166.5000				-9.4000				£15410
2121- *15410						45.5000	0													
2122- GRID	*1806					0						166.5000				-12.5000				£15411
2123- *15411						45.5000	0													
2124- GRID	*1807					0						166.5000				.0				£15412
2125- *15412						51.5000	0													
2126- GRID	*1808					0						166.5000				-1.7051				£15413
2127- *15413						51.5000	0													
2128- GRID	*1809					0						166.5000				-4.3000				£15414
2129- *15414						51.5000	0													
2130- GRID	*1810					0						166.5000				-7.8500				£15415
2131- *15415						51.5000	0													
2132- GRID	*1811					0						166.5000				-9.4000				£15416
2133- *15416						51.5000	0													
2134- GRID	*1812					0						166.5000				-12.5000				£15417
2135- *15417						51.5000	0													
2136- GRID	*1813					0						166.5000				-8.6140				£15418
2137- *15418						53.9960	0													
2138- GRID	*1814					0						166.5000				-12.5000				£15419
2139- *15419						53.9960	0													
2140- GRID	*1815					0						166.5000				-7.7030				£15420
2141- *15420						56.7000	0													
2142- GRID	*1817					0						166.5000				-12.5000				£15421
2143- *15421						56.7000	0													
2144- GRID	*1818					0						166.5000				-6.9200				£15422
2145- *15422						59.3750	0													
2146- GRID	*1819					0						166.5000				-10.5000				£15423
2147- *15423						59.3750	0													
2148- GRID	*1820					0						166.5000				-12.5000				£15424
2149- *15424						59.3750	0													
2150- GRID	*1821					0						166.5000				.0				£15425

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O																					
CARD	COUNT.	1	..	2	..	3	..	4	..	5	..	6	..	7	..	8	..	9	..	10	.
2151-*	15425			62.5000	0																
2152-	GRID		*1822		0					166.5000				-5.9360						615426	
2153-	*15426			62.5000	0																
2154-	GRID		*1823		0					166.5000				-10.5000						615427	
2155-	*15427			62.5000	0																
2156-	GRID		*1824		0					166.5000				-12.5000						615428	
2157-	*15428			62.5000	0																
2158-	GRID		*1825		0					166.5000				.0						615429	
2159-	*15429			64.9000	0																
2160-	GRID		*1826		0					166.5000				-5.1600						615430	
2161-	*15430			64.9000	0																
2162-	GRID		*1827		0					166.5000				-9.7007						615431	
2163-	*15431			66.5181	0																
2164-	GRID		*1828		0					166.5000				-11.5485						615432	
2165-	*15432			67.2835	0																
2166-	GRID		*1829		0					166.5000				.0						615433	
2167-	*15433			69.9247	0																
2168-	GRID		*1830		0					166.5000				-3.5580						615434	
2169-	*15434			69.9247	0																
2170-	GRID		*1831		0					166.5000				-7.4247						615435	
2171-	*15435			69.9247	0																
2172-	GRID		*1832		0					166.5000				-8.8389						615436	
2173-	*15436			71.3389	0																
2174-	GRID		*1833		0					166.5000				.0						615437	
2175-	*15437			73.0000	0																
2176-	GRID		*1834		0					166.5000				-2.8190						615438	
2177-	*15438			72.4000	0																
2178-	GRID		*1835		0					166.5000				-4.0181						615439	
2179-	*15439			72.2007	0																
2180-	GRID		*1836		0					166.5000				-4.7835						615440	
2181-	*15440			74.0485	0																
2182-	GRID		*1837		0					166.5000				.0						615441	
2183-	*15441			75.0000	0																
2184-	GRID		*1838		0					166.5000				-2.0000						615442	
2185-	*15442			75.0000	0																
2186-	GRID		*1901		0					170.7500				.0						615444	
2187-	*15444			45.5000	0																
2188-	GRID		*1902		0					170.7500				-1.7051						615445	
2189-	*15445			45.5000	0																
2190-	GRID		*1903		0					170.7500				-4.3000						615446	
2191-	*15446			45.5000	0																
2192-	GRID		*1904		0					170.7500				-6.2500						615447	
2193-	*15447			45.5000	0																
2194-	GRID		*1905		0					170.7500				-12.5000						615448	
2195-	*15448			45.5000	0																
2196-	GRID		*1906		0					170.7500				.0						615449	
2197-	*15449			47.3300	0																
2198-	GRID		*1907		0					170.7500				-1.7051						615450	
2199-	*15450			47.3300	0																
2200-	GRID		*1908		0					170.7500				-4.3000						615451	

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D B U L K D A T A E C H O										
CARD	1	2	3	4	5	6	7	8	9	10
2201- *15451			47.3300 0							
2202- GRID *1909			0			170.7500		-6.7358		815452
2203- *15452			47.3300 0							
2204- GRID *1910			0			170.7500		.0		815453
2205- *15453			50.3300 0							
2206- GRID *1911			0			170.7500		-1.7051		815454
2207- *15454			50.3300 0							
2208- GRID *1912			0			170.7500		-4.3000		815455
2209- *15455			50.3300 0							
2210- GRID *1913			0			170.7500		-7.5428		815456
2211- *15456			50.3300 0							
2212- GRID *1914			0			170.7500		.0		815457
2213- *15457			51.5000 0							
2214- GRID *1915			0			170.7500		-1.7051		815458
2215- *15458			51.5000 0							
2216- GRID *1916			0			170.7500		-4.3000		815459
2217- *15459			51.5000 0							
2218- GRID *1917			0			170.7500		-7.8560		815460
2219- *15460			51.5000 0							
2220- GRID *1918			0			170.7500		-12.5000		815461
2221- *15461			51.5000 0							
2222- GRID *1919			0			170.7500		-12.5000		815462
2223- *15462			53.9960 0							
2224- GRID *1920			0			170.7500		-12.5000		815463
2225- *15463			56.7000 0							
2226- GRID *1921			0			170.7500		-12.5000		815464
2227- *15464			59.3750 0							
2228- GRID *1922			0			170.7500		-12.5000		815465
2229- *15465			63.4400 0							
2230- GRID *1923			0			170.7500		-11.8485		815466
2231- *15466			67.2835 0							
2232- GRID *1924			0			170.7500		-8.8389		815467
2233- *15467			71.3389 0							
2234- GRID *1925			0			170.7500		-4.7835		815468
2235- *15468			74.0485 0							
2236- GRID *1926			0			170.7500		-2.0000		815469
2237- *15469			75.0000 0							
2238- GRID *1927			0			170.7500		.0		815470
2239- *15470			75.0000 0							
2240- GRID *1928			0			170.7500		-9.4000		815471
2241- *15471			51.5000 0							
2242- GRID *1929			0			170.7500		-5.9360		815472
2243- *15472			63.4400 0							
2244- GRID *1930			0			170.7500		.0		815473
2245- *15473			63.4400 0							
2246- GRID *1931			0			173.9539		-12.5000		815474
2247- *15474			59.3750 0							
2248- GRID *1932			0			173.9539		-12.5000		815475
2249- *15475			64.1484 0							
2250- GRID *1933			0			173.9539		-6.7057		815476

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   C A T A   E C H O																				
CARD	COUNT	1	..	2	..	3	..	4	..	5	..	6	..	7	..	8	..	9	..	10
2251-	*15476					64.1484	0													
2252-	GRID			*1934			0					173.9539		.0						£15477
2253-	*15477					64.1484	0													
2254-	GRID			*1935			0					175.5633		-5.1393						£15478
2255-	*15478					51.9237	0													
2256-	GRID			*1936			0					175.5633		.0						£15479
2257-	*15479					51.9237	0													
2258-	GRID			*2001			0					180.0090		.0						£15480
2259-	*15480					45.5000	0													
2260-	GRID			*2002			0					180.0090		-1.7051						£15481
2261-	*15481					45.5000	0													
2262-	GRID			*2003			0					180.0090		-4.3000						£15482
2263-	*15482					45.5000	0													
2264-	GRID			*2004			0					180.0090		-6.2500						£15483
2265-	*15483					45.5000	0													
2266-	GRID			*2005			0					180.0090		-12.5000						£15484
2267-	*15484					45.5000	0													
2268-	GRID			*2006			0					179.2220		.0						£15485
2269-	*15485					51.5000	0													
2270-	GRID			*2007			0					179.2220		-1.7051						£15486
2271-	*15486					51.5000	0													
2272-	GRID			*2008			0					179.2220		-4.3000						£15487
2273-	*15487					51.5000	0													
2274-	GRID			*2009			0					179.2220		-6.2500						£15488
2275-	*15488					51.5000	0													
2276-	GRID			*2010			0					179.2220		-12.5000						£15489
2277-	*15489					51.5000	0													
2278-	GRID			*2011			0					178.8910		.0						£15490
2279-	*15490					53.9960	0													
2280-	GRID			*2012			0					178.8910		-1.7051						£15491
2281-	*15491					53.9960	0													
2282-	GRID			*2013			0					178.8910		-4.3000						£15492
2283-	*15492					53.9960	0													
2284-	GRID			*2014			0					178.8910		-6.4000						£15493
2285-	*15493					53.9960	0													
2286-	GRID			*2015			0					178.8910		-12.5000						£15494
2287-	*15494					53.9960	0													
2288-	GRID			*2016			0					178.5400		.0						£15495
2289-	*15495					56.7000	0													
2290-	GRID			*2017			0					178.5400		-1.7051						£15496
2291-	*15496					56.7000	0													
2292-	GRID			*2018			0					178.5400		-4.3000						£15497
2293-	*15497					56.7000	0													
2294-	GRID			*2019			0					178.5400		-6.7460						£15498
2295-	*15498					56.7000	0													
2296-	GRID			*2020			0					178.5400		-12.5000						£15499
2297-	*15499					56.7000	0													
2298-	GRID			*2021			0					178.1890		.0						£15500
2299-	*15500					59.3750	0													
2300-	GRID			*2022			0					178.1890		-1.7051						£15501

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O										
CARD	1	2	3	4	5	6	7	8	9	10
2301- #15501			59.3750 0							
2302- GRID #2023			0			178.1890		-4.3000		615502
2303- #15502			59.3750 0							
2304- GRID #2024			0			178.1890		-7.0850		615503
2305- #15503			59.3750 0							
2306- GRID #2025			0			178.1890		-12.5000		615504
2307- #15504			59.3750 0							
2308- GRID #2026			0			177.4520		.0		615505
2309- #15505			64.9220 0							
2310- GRID #2027			0			177.4520		-1.7051		615506
2311- #15506			64.9220 0							
2312- GRID #2028			0			177.4520		-4.3000		615507
2313- #15507			64.9220 0							
2314- GRID #2029			0			177.4520		-7.8000		615508
2315- #15508			64.9220 0							
2316- GRID #2030			0			177.4520		-12.5000		615509
2317- #15509			64.9220 0							
2318- GRID #2031			0			177.1410		.0		615510
2319- #15510			67.2835 0							
2320- GRID #2032			0			177.1410		-1.7051		615511
2321- #15511			67.2835 0							
2322- GRID #2033			0			177.1410		-4.3000		615512
2323- #15512			67.2835 0							
2324- GRID #2034			0			177.1410		-8.1823		615513
2325- #15513			67.2835 0							
2326- GRID #2035			0			177.1410		-11.5485		615514
2327- #15514			67.2835 0							
2328- GRID #2036			0			176.6070		.0		615515
2329- #15515			71.3389 0							
2330- GRID #2037			0			176.6070		-1.7051		615516
2331- #15516			71.3389 0							
2332- GRID #2038			0			176.6070		-4.3000		615517
2333- #15517			71.3389 0							
2334- GRID #2039			0			176.6070		-8.8389		615518
2335- #15518			71.3389 0							
2336- GRID #2040			0			176.1250		.0		615519
2337- #15519			75.0000 0							
2338- GRID #2041			0			176.1250		-2.0000		615520
2339- #15520			75.0000 0							
2340- GRID #2042			0			176.2500		-4.7835		615521
2341- #15521			74.0485 0							
2342- GRID #2101			0			186.2500		.0		615522
2343- #15522			45.5000 0							
2344- GRID #2102			0			186.2500		-1.7051		615523
2345- #15523			45.5000 0							
2346- GRID #2103			0			186.2500		-4.3000		615524
2347- #15524			45.5000 0							
2348- GRID #2104			0			186.2500		-6.2500		615525
2349- #15525			45.5000 0							
2350- GRID #2105			0			186.2500		-12.5000		615526

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D B U L K D A T A E C H O											
CARD	COUNT	1	2	3	4	5	6	7	8	9	10
2351-	*15526			45.5000	0						
2352-	GRID	*2106			0		185.4630		-12.5000		615527
2353-	*15527			51.5000	0						
2354-	GRID	*2107			0		185.1320		-12.5000		615528
2355-	*15528			53.9960	0						
2356-	GRID	*2108			0		184.7810		-12.5000		615529
2357-	*15529			56.7000	0						
2358-	GRID	*2109			0		184.4300		-12.5000		615530
2359-	*15530			59.3750	0						
2360-	GRID	*2110			0		183.6930		-12.5000		615531
2361-	*15531			64.9220	0						
2362-	GRID	*2111			0		183.3820		-11.5485		615532
2363-	*15532			67.2835	0						
2364-	GRID	*2112			0		182.8480		-8.8389		615533
2365-	*15533			71.3389	0						
2366-	GRID	*2113			0		182.4910		-4.7835		615534
2367-	*15534			74.0485	0						
2368-	GRID	*2114			0		182.3660		-2.0000		615535
2369-	*15535			75.0000	0						
2370-	GRID	*2115			0		182.3660		.0		615536
2371-	*15536			75.0000	0						
2372-	GRID	2200		0	171.687	-11.9606	70.4518	0			
2373-	MAT1	1		1.0567		.3					
2374-	MAT1	2		1.0567		.3	.1				
2375-	MAT1	4		1.0567		.3					
2376-	MAT1	6		1.0567		.3					
2377-	MAT1	8		1.0567		.3	.1				
2378-	MAT1	11		1.0567		.3	.1				
2379-	MAT1	12		1.0567		.3					
2380-	MAT1	16		1.0567		.3	.1				
2381-	MAT1	18		3.0067		.3	.264				
2382-	MAT1	28		3.0067		.3					
2383-	MPC	100		213	1	4.1039	207	1	-2.8022		6M213X
2384-	6M213X			219	1	-1.3017					
2385-	MPC	100		223	1	5.1087	222	1	-2.0244		6M223X
2386-	6M223X			224	1	-3.0843					
2387-	MPC	100		401	2	1.0	301	2	-1.0		
2388-	MPC	100		401	3	1.0	301	3	-1.0		
2389-	MPC	100		910	2	5.514	905	2	-1.514		6M910Y
2390-	6M910Y			915	2	-4.0					
2391-	MPC	100		1010	2	5.667	1005	2	-1.667		6M1010Y
2392-	6M1010Y			1015	2	-4.0					
2393-	MPC	100		1110	2	6.000	1105	2	-2.000		6M1110Y
2394-	6M1110Y			1115	2	-4.0					
2395-	MPC	100		1419	3	4.644	1409	3	-3.1		6M1419Z
2396-	6M1419Z			1410	3	-1.544					
2397-	MPC	100		1512	3	8.625	1402	3	-3.0		6M1512Z
2398-	6M1512Z			1602	3	-5.625					
2399-	MPC	100		1513	3	8.625	1403	3	-3.0		6M1513Z
2400-	6M1513Z			1603	3	-5.625					

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

SORTED BULK DATA ECHO

CARD	COUNT	1	2	3	4	5	6	7	8	9	10
2401-	MPC	100	1514	3	8.625	1404	3	-3.0			CM1514Z
2402-	CM1514Z		1604	3	-5.625						
2403-	MPC	100	1515	3	8.625	1405	3	-3.0			CM1515Z
2404-	CM1515Z		1605	3	-5.625						
2405-	MPC	100	1517	3	8.625	1407	3	-3.0			CM1517Z
2406-	CM1517Z		1607	3	-5.625						
2407-	MPC	100	1518	3	8.625	1408	3	-3.0			CM1518Z
2408-	CM1518Z		1608	3	-5.625						
2409-	MPC	100	1519	3	4.644	1501	3	-3.1			CM1519Z
2410-	CM1519Z		1502	3	-1.544						
2411-	MPC	100	1619	3	4.644	1609	3	-3.1			CM1619Z
2412-	CM1619Z		1610	3	-1.544						
2413-	MPC	100	1620	3	4.644	1609	3	-3.1			CM1620Z
2414-	CM1620Z		1610	3	-1.544						
2415-	MPC	100	1652	3	1.0	1602	3	-.5			CM1652Z
2416-	CM1652Z		1702	3	-.5						
2417-	MPC	100	1653	3	1.0	1603	3	-.5			CM1653Z
2418-	CM1653Z		1703	3	-.5						
2419-	MPC	100	1654	3	1.0	1604	3	-.5			CM1654Z
2420-	CM1654Z		1704	3	-.5						
2421-	MPC	100	1655	3	1.0	1605	3	-.5			CM1655Z
2422-	CM1655Z		1705	3	-.5						
2423-	MPC	100	1657	2	1.0	1612	2	-.5			CM1657Y
2424-	CM1657Y		1712	2	-.5						
2425-	MPC	100	1658	2	1.0	1614	2	-.5			CM1658Y
2426-	CM1658Y		1714	2	-.5						
2427-	MPC	100	1659	2	1.0	1616	2	-.5			CM1659Y
2428-	CM1659Y		1716	2	-.5						
2429-	MPC	100	1662	3	1.0	1607	3	-.5			CM1662Z
2430-	CM1662Z		1707	3	-.5						
2431-	MPC	100	1663	3	1.0	1608	3	-.5			CM1663Z
2432-	CM1663Z		1708	3	-.5						
2433-	MPC	100	1664	3	1.0	1609	3	-.5			CM1664Z
2434-	CM1664Z		1709	3	-.5						
2435-	MPC	100	1665	3	4.644	1609	3	-1.55			CM1665ZA
2436-	CM1665ZA		1610	3	-7.72	1709	3	-1.55			CM1665ZB
2437-	CM1665ZB		1710	3	-7.72						
2438-	MPC	100	1719	3	4.644	1705	3	-3.1			CM1719Z
2439-	CM1719Z		1710	3	-1.544						
2440-	MPC	100	1720	3	4.644	1709	3	-3.1			CM1720Z
2441-	CM1720Z		1710	3	-1.544						
2442-	MPC	100	1805	1	6.25	1804	1	-3.1			CM1805X
2443-	CM1805X		1806	1	-3.15						
2444-	MPC	100	1823	1	6.564	1822	1	-2.0			CM1823X
2445-	CM1823X		1824	1	-4.564						
2446-	MPC	100	1824	4	1.0	1823	3	-.5			CM1824MX
2447-	CM1824MX		1824	3	-.5						
2448-	MPC	100	1828	1	1.0	2200	1	-1.0			CM1828
2449-	CM1828		2200	5	3.2083	2200	6	.4121			
2450-	MPC	100	1828	2	1.0	2200	2	-1.0			CM1828



PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

SORTED BULK DATA ECHO																		
CARD	1	2	3	4	5	6	7	8	9	10								
COUNT .	1	2	3	4	5	6	7	8	9	10								
2451- E49			2200	4	-3.2083	2200	6	5.1E7										
2452- MPC	100		1828	3	1.0	2200	3	-1.0		E50								
2453- E50			2200	4	-.4121	2200	5	-5.1E7										
2454- MPC	100		1832	1	1.0	2200	1	-1.0		E45								
2455- E45			2200	5	-0.8471	2200	6	3.1217										
2456- MPC	100		1832	2	1.0	2200	2	-1.0		E46								
2457- E46			2200	4	.8471	2200	6	5.1E7										
2458- MPC	100		1832	3	1.0	2200	3	-1.0		E47								
2459- E47			2200	4	-3.1217	2200	5	-5.1E7										
2460- MPC	100		1928	3	4.644	1917	3	-3.1		EM1928Z								
2461- EM1928Z			1918	3	-1.544													
2462- MPC	100		1931	2	7.439	1921	2	-4.2351		EM1931FY								
2463- EM1931FY			2025	2	-3.2039													
2464- MPC	100		2035	1	1.0	2200	1	-1.0		E54								
2465- E54			2200	5	3.2083	2200	6	.4121										
2466- MPC	100		2035	2	1.0	2200	2	-1.0		E55								
2467- E55			2200	4	-3.2083	2200	6	-5.454										
2468- MPC	100		2035	3	1.0	2200	3	-1.0		E56								
2469- E56			2200	4	-.4121	2200	5	5.454										
2470- MPC	100		2039	1	1.0	2200	1	-1.0		E51								
2471- E51			2200	5	-0.8471	2200	6	3.1217										
2472- MPC	100		2039	2	1.0	2200	2	-1.0		E52								
2473- E52			2200	4	.8471	2200	6	-4.920										
2474- MPC	100		2039	3	1.0	2200	3	-1.0		E53								
2475- E53			2200	4	-3.1217	2200	5	4.920										
2476- MPC	101		1701	1	1.0	1701	3	-.01E99		EM1701 XS								
2477- EM1701 XS			1800	1	-1.001871801		3	-.04417										
2478- MPC	101		1721	1	1.0	1701	3	-.01E99		EM1721 XS								
2479- EM1721 XS			1800	1	-1.001871801		3	-.04417										
2480- MPC	101		1721	3	1.0	1701	3	-.27778		EM1721 ZS								
2481- EM1721 ZS			1801	3	-.72222													
2482- MPC	101		1723	1	1.0	1721	1	-1.0										
2483- MPC	101		1724	1	1.0	1722	1	-1.0										
2484- MPC	101		1800	3	1.0	1701	3	-.27830		EM1800 ZS								
2485- EM1800 ZS			1800	1	-.06116	1801	3	-.7235E										
2486- MPC	101		1801	1	1.0	1701	3	-.01E99		EM1801 XS								
2487- EM1801 XS			1800	1	-1.001871801		3	-.04417										
2488- MPC	101		1802	1	1.0	1701	3	-.01E99		EM1802 XS								
2489- EM1802 XS			1800	1	-1.001871801		3	-.04417										
2490- MPC	101		1802	3	1.0	1801	3	-1.0										
2491- MPC	102		1721	1	1.0	1701	2	.37852		EM1721 XA								
2492- EM1721 XA			1800	2	-.37892													
2493- MPC	102		1721	2	1.0	1800	2	-1.0										
2494- MPC	102		1721	3	1.0	1802	3	-.72225										
2495- MPC	102		1801	2	1.0	1800	2	-1.38462		EM1801 YA								
2496- EM1801 YA			1701	2	.38462													
2497- MPC	102		1802	1	1.0	1701	2	.52465		EM1802 XA								
2498- EM1802 XA			1800	2	-.52465													
2499- MPC	102		1802	2	1.0	1800	2	-1.38462		EM1802 YA								
2500- EM1802 YA			1701	2	.38462													

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O										
CARD	1	2	3	4	5	6	7	8	9	10
2501- MPCADD	401	100	101							
2502- MPCADD	402	100	102							
2503- PARAM	GRDPNT	0								
2504- PARAM	TPCOPY	1								
2505- PARAM	TPNAME	FUSSP1								
2506- PARAM	WTMASS	.002588								
2507- PBAR	181	12	.001	.001						
2508- PBAR	194	28	.001	.001						
2509- PBAR	463	2	.232	.0422	.0	.0	.0			
2510- PBAR	464	2	.232	.0422	.0	.0	.0			
2511- PBAR	465	2	.232	.0422	.0	.0	.0			
2512- PBAR	466	2	.232	.0422	.0	.0	.0			
2513- PBAR	467	2	.232	.0422	.0	.0	.0			
2514- PBAR	1927	2	.103	.0343	.0	.0	.0			
2515- PBAR	1928	2	.103	.0343	.0	.0	.0			
2516- PBAR	1929	2	.103	.0343	.0	.0	.0			
2517- PBAR	1930	2	.103	.0343	.0	.0	.0			
2518- PBAR	1931	2	.103	.0343	.0	.0	.0			
2519- PBAR	2101	2	.0992	.0325	.001	.001	.0			
2520- PBAR	2102	2	.0992	.0325	.001	.001	.0			
2521- PBAR	2103	2	.0992	.0325	.001	.001	.0			
2522- PBAR	2104	2	.0992	.0325	.001	.001	.0			
2523- PBAR	2105	2	.1048	.0355	.001	.001	.0			
2524- PBAR	2106	2	.1048	.0355	.001	.001	.0			
2525- PBAR	2107	2	.1048	.0355	.001	.001	.0			
2526- PBAR	2108	2	.1048	.0355	.001	.001	.0			
2527- PBAR	2109	2	.1048	.0355	.001	.001	.0			
2528- PBAR	2110	2	.1048	.0355	.001	.001	.0			
2529- PBAR	2111	2	.1048	.0355	.001	.001	.0			
2530- PBAR	2112	2	.1048	.0355	.001	.001	.0			
2531- PBAR	2113	2	.1048	.0355	.001	.001	.0			
2532- PBAR	2114	2	.1048	.0355	.001	.001	.0			
2533- PBAR	2502	2	.10	.0465	.0	.0	.0			
2534- PBAR	2503	2	.10	.0465	.0	.0	.0			
2535- PBAR	2504	2	.10	.0465	.0	.0	.0			
2536- PBAR	2505	2	.10	.0465	.0	.0	.0			
2537- PBAR	2506	2	.10	.0465	.0	.0	.0			
2538- PBAR	2507	2	.10	.0465	.0	.0	.0			
2539- PBAR	2508	2	.10	.0465	.0	.0	.0			
2540- PBAR	2509	2	.10	.0465	.0	.0	.0			
2541- PBAR	2510	2	.10	.0465	.0	.0	.0			
2542- PBAR	2511	2	.10	.0465	.0	.0	.0			
2543- PBAR	2512	2	.10	.0465	.0	.0	.0			
2544- PBAR	2513	2	.10	.0465	.0	.0	.0			
2545- PBAR	2514	2	.10	.0465	.0	.0	.0			
2546- PBAR	2515	2	.10	.0465	.0	.0	.0			
2547- PBAR	2516	2	.10	.0465	.0	.0	.0			
2548- PBAR	2517	2	.10	.0465	.0	.0	.0			
2549- PBAR	2518	2	.10	.0465	.0	.0	.0			
2550- PBAR	2519	2	.10	.0465	.0	.0	.0			

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

CARD		S O R T E D   B U L K   C A T A   E C H O									
COUNT .	1 ..	2 ..	3 ..	4 ..	5 ..	6 ..	7 ..	8 ..	9 ..	10 .	
2551-	PBAR	2713	2	.0649	.03	.0	.0	.0			
2552-	PQDMEM2	10161	6	.04000							
2553-	PQDMEM2	10162	6	.04000							
2554-	PQDMEM2	10163	6	.04000							
2555-	PQDMEM2	10164	6	.04000							
2556-	PQDMEM2	10165	6	.04000							
2557-	PQDMEM2	10166	6	.04000							
2558-	PQDMEM2	10167	6	.04000							
2559-	PQDMEM2	10168	6	.04000							
2560-	PQDMEM2	10169	6	.04000							
2561-	PQDMEM2	10170	6	.04000							
2562-	PQDMEM2	10171	6	.04000							
2563-	PQDMEM2	10172	6	.04000							
2564-	PQDMEM2	10173	6	.04000							
2565-	PQDMEM2	10174	6	.04000							
2566-	PQDMEM2	10175	6	.04000							
2567-	PQDMEM2	10176	6	.04000							
2568-	PQDMEM2	10177	6	.04000							
2569-	PQDMEM2	10270	6	.04000							
2570-	PQDMEM2	10271	6	.04000							
2571-	PQDMEM2	10272	6	.04000							
2572-	PQDMEM2	10273	6	.04000							
2573-	PQDMEM2	10274	6	.04000							
2574-	PQDMEM2	10275	6	.04000							
2575-	PQDMEM2	10276	6	.04000							
2576-	PQDMEM2	10277	6	.04000							
2577-	PQDMEM2	10278	6	.04000							
2578-	PQDMEM2	10279	6	.04000							
2579-	PQDMEM2	10280	6	.04000							
2580-	PQDMEM2	10281	6	.04000							
2581-	PQDMEM2	10282	6	.04000							
2582-	PQDMEM2	10283	6	.04000							
2583-	PQDMEM2	10284	6	.04000							
2584-	PQDMEM2	10285	6	.04000							
2585-	PQDMEM2	10286	6	.04000							
2586-	PQDMEM2	12040	6	.03200							
2587-	PQDMEM2	12041	6	.03200							
2588-	PQDMEM2	12042	6	.03200							
2589-	PQDMEM2	12043	6	.03200							
2590-	PQDMEM2	12044	6	.03200							
2591-	PQDMEM2	12045	6	.03200							
2592-	PQDMEM2	12046	6	.03200							
2593-	PQDMEM2	12047	6	.03200							
2594-	PQDMEM2	12048	6	.03200							
2595-	PQDMEM2	12049	6	.03200							
2596-	PQDMEM2	12050	6	.03200							
2597-	PQDMEM2	12051	6	.03200							
2598-	PQDMEM2	12052	6	.03200							
2599-	PQDMEM2	12053	6	.03200							
2600-	PQDMEM2	12054	6	.03200							

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

CARD		S O R T E D   B U L K   C A T A   E C H O									
COUNT	1	2	3	4	5	6	7	8	9	10	
2601-	PQDMEM2	12055	6	.03200							
2602-	PQDMEM2	12056	6	.03200							
2603-	PQDMEM2	12057	6	.03200							
2604-	PQDMEM2	12058	6	.03200							
2605-	PQDMEM2	12059	6	.03200							
2606-	PQDMEM2	12060	6	.03200							
2607-	PQDMEM2	12061	6	.03200							
2608-	PQDMEM2	12062	6	.03200							
2609-	PQDMEM2	12063	6	.03200							
2610-	PQDMEM2	12064	6	.03200							
2611-	PQDMEM2	12065	6	.03200							
2612-	PQDMEM2	12066	6	.03200							
2613-	PQDMEM2	12068	6	.03200							
2614-	PQDMEM2	12069	6	.03200							
2615-	PQDMEM2	12200	8	.02000							
2616-	PQDMEM2	12201	8	.02000							
2617-	PQDMEM2	12202	8	.02000							
2618-	PQDMEM2	12203	8	.02000							
2619-	PQDMEM2	12204	8	.02000							
2620-	PQDMEM2	12205	8	.02000							
2621-	PQDMEM2	12206	8	.02000							
2622-	PQDMEM2	12207	8	.02000							
2623-	PQDMEM2	12208	8	.02000							
2624-	PQDMEM2	12209	8	.02000							
2625-	PQDMEM2	12210	8	.02500							
2626-	PQDMEM2	12211	8	.02500							
2627-	PQDMEM2	12212	8	.02500							
2628-	PQDMEM2	12213	8	.02500							
2629-	PQDMEM2	12214	8	.02500							
2630-	PQDMEM2	12215	8	.02500							
2631-	PQDMEM2	12216	8	.02500							
2632-	PQDMEM2	12217	8	.02500							
2633-	PQDMEM2	12218	8	.02500							
2634-	PQDMEM2	12219	8	.02500							
2635-	PQDMEM2	12220	8	.02500							
2636-	PQDMEM2	12221	8	.02500							
2637-	PQDMEM2	12222	8	.02500							
2638-	PQDMEM2	12223	8	.02500							
2639-	PQDMEM2	12224	8	.02500							
2640-	PQDMEM2	12225	8	.02500							
2641-	PQDMEM2	12226	8	.02500							
2642-	PQDMEM2	12227	8	.02500							
2643-	PQDMEM2	12228	8	.02500							
2644-	PQDMEM2	12229	8	.02500							
2645-	PQDMEM2	12230	8	.02500							
2646-	PQDMEM2	12231	8	.02500							
2647-	PQDMEM2	12232	8	.02500							
2648-	PQDMEM2	12233	8	.02500							
2649-	PQDMEM2	12234	8	.02500							
2650-	PQDMEM2	12235	8	.02500							

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

CARD		S O R T E D   B U L K   D A T A   E C H O									
COUNT	1	2	3	4	5	6	7	8	9	10	
2651-	PQDMEM2	12236	8	.02500							
2652-	PQDMEM2	12237	8	.02500							
2653-	PQDMEM2	12238	8	.02500							
2654-	PQDMEM2	12239	8	.02500							
2655-	PQDMEM2	12240	8	.02500							
2656-	PQDMEM2	12241	8	.02500							
2657-	PQDMEM2	12242	8	.02500							
2658-	PQDMEM2	12243	8	.02500							
2659-	PQDMEM2	12244	8	.02500							
2660-	PQDMEM2	12245	8	.02500							
2661-	PQDMEM2	12246	8	.02500							
2662-	PQDMEM2	12247	8	.02500							
2663-	PQDMEM2	12248	8	.02500							
2664-	PQDMEM2	12249	8	.02500							
2665-	PQDMEM2	12250	8	.02500							
2666-	PQDMEM2	12251	8	.02500							
2667-	PQDMEM2	12252	8	.02500							
2668-	PQDMEM2	12253	8	.02500							
2669-	PQDMEM2	12254	8	.02500							
2670-	PQDMEM2	12255	8	.02500							
2671-	PQDMEM2	12256	8	.02500							
2672-	PQDMEM2	12257	8	.02500							
2673-	PQDMEM2	12258	8	.02500							
2674-	PQDMEM2	12259	8	.02500							
2675-	PQDMEM2	12260	8	.02500							
2676-	PQDMEM2	12261	8	.02500							
2677-	PQDMEM2	12262	8	.02500							
2678-	PQDMEM2	12263	8	.02500							
2679-	PQDMEM2	12264	8	.02500							
2680-	PQDMEM2	12265	8	.02500							
2681-	PQDMEM2	12266	8	.02500							
2682-	PQDMEM2	12267	8	.02500							
2683-	PQDMEM2	12268	8	.02500							
2684-	PQDMEM2	12269	8	.02500							
2685-	PQDMEM2	12270	8	.02500							
2686-	PQDMEM2	12271	8	.02500							
2687-	PQDMEM2	12272	8	.02500							
2688-	PQDMEM2	12273	8	.02500							
2689-	PQDMEM2	12274	8	.02500							
2690-	PQDMEM2	12275	8	.02500							
2691-	PQDMEM2	12276	8	.02500							
2692-	PQDMEM2	12277	8	.02500							
2693-	PQDMEM2	12279	8	.02500							
2694-	PQDMEM2	12280	8	.02500							
2695-	PQDMEM2	12281	8	.02500							
2696-	PQDMEM2	12282	8	.02500							
2697-	PQDMEM2	12283	8	.02500							
2698-	PQDMEM2	12284	8	.02500							
2699-	PQDMEM2	12285	8	.02500							
2700-	PQDMEM2	12286	8	.02500							

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

CARD			S O R T E D   B U L K   D A T A   E C H O									
COUNT	1	2	3	4	5	6	7	8	9	10		
2701-	PQD MEM2	12287	8	.02500								
2702-	PQD MEM2	12288	8	.02500								
2703-	PQD MEM2	12289	8	.02500								
2704-	PQD MEM2	12290	8	.02500								
2705-	PQD MEM2	12291	8	.02500								
2706-	PQD MEM2	12292	8	.02500								
2707-	PQD MEM2	12293	8	.02500								
2708-	PQD MEM2	12300	8	.02000								
2709-	PQD MEM2	12301	8	.02000								
2710-	PQD MEM2	12302	8	.02000								
2711-	PQD MEM2	12303	8	.02000								
2712-	PQD MEM2	12304	8	.02000								
2713-	PQD MEM2	12305	8	.02000								
2714-	PQD MEM2	12306	8	.02000								
2715-	PQD MEM2	12307	8	.02000								
2716-	PQD MEM2	12308	8	.02000								
2717-	PQD MEM2	12309	8	.02000								
2718-	PQD MEM2	12310	8	.02000								
2719-	PQD MEM2	12311	8	.02000								
2720-	PQD MEM2	12312	8	.02000								
2721-	PQD MEM2	12313	8	.02000								
2722-	PQD MEM2	12314	8	.02000								
2723-	PQD MEM2	12315	8	.02000								
2724-	PQD MEM2	12316	8	.02000								
2725-	PQD MEM2	12317	8	.02000								
2726-	PQD MEM2	12318	8	.02000								
2727-	PQD MEM2	12319	8	.02000								
2728-	PQD MEM2	12320	8	.02000								
2729-	PQD MEM2	12321	8	.02000								
2730-	PQD MEM2	12322	8	.02000								
2731-	PQD MEM2	12323	8	.02000								
2732-	PQD MEM2	12324	8	.02000								
2733-	PQD MEM2	12325	8	.02000								
2734-	PQD MEM2	12326	8	.02000								
2735-	PQD MEM2	12327	8	.02000								
2736-	PQD MEM2	12328	8	.02000								
2737-	PQD MEM2	12329	8	.02000								
2738-	PQD MEM2	12330	8	.02000								
2739-	PQD MEM2	12331	8	.02000								
2740-	PQD MEM2	12332	8	.02000								
2741-	PQD MEM2	12333	8	.02000								
2742-	PQD MEM2	12334	8	.02000								
2743-	PQD MEM2	12335	8	.02000								
2744-	PQD MEM2	12336	8	.02000								
2745-	PQD MEM2	12337	8	.02000								
2746-	PQD MEM2	12338	8	.02000								
2747-	PQD MEM2	12339	8	.02000								
2748-	PQD MEM2	12340	8	.02000								
2749-	PQD MEM2	12341	8	.02000								
2750-	PQD MEM2	12342	8	.02000								

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

CARD		S O R T E D   B U L K   D A T A   E C H O									
COUNT	1	2	3	4	5	6	7	8	9	10	
2751-	PQDMEM2	12343	8	.02000							
2752-	PQDMEM2	12344	8	.02000							
2753-	PQDMEM2	12345	8	.02000							
2754-	PQDMEM2	12346	8	.02000							
2755-	PQDMEM2	12347	8	.02000							
2756-	PQDMEM2	12348	8	.02000							
2757-	PQDMEM2	12349	8	.02000							
2758-	PQDMEM2	12350	8	.02000							
2759-	PQDMEM2	12351	8	.02000							
2760-	PQDMEM2	12352	8	.02000							
2761-	PQDMEM2	12353	8	.02000							
2762-	PQDMEM2	12354	8	.02000							
2763-	PQDMEM2	12355	8	.02000							
2764-	PQDMEM2	12356	8	.02000							
2765-	PQDMEM2	12357	8	.02000							
2766-	PQDMEM2	12358	8	.02000							
2767-	PQDMEM2	12359	8	.02000							
2768-	PQDMEM2	12360	8	.02000							
2769-	PQDMEM2	12361	8	.02000							
2770-	PQDMEM2	12362	8	.02000							
2771-	PQDMEM2	12363	8	.02000							
2772-	PQDMEM2	12364	8	.02000							
2773-	PQDMEM2	12365	8	.02000							
2774-	PQDMEM2	12366	8	.02000							
2775-	PQDMEM2	12367	8	.02000							
2776-	PQDMEM2	12368	8	.02000							
2777-	PQDMEM2	12369	8	.02000							
2778-	PQDMEM2	12370	8	.02000							
2779-	PQDMEM2	12371	8	.02000							
2780-	PQDMEM2	12372	8	.02000							
2781-	PQDMEM2	12373	8	.02000							
2782-	PQDMEM2	12374	8	.02000							
2783-	PQDMEM2	12375	8	.02000							
2784-	PQDMEM2	12376	8	.02000							
2785-	PQDMEM2	12377	8	.02000							
2786-	PQDMEM2	12378	8	.02000							
2787-	PQDMEM2	12379	8	.02000							
2788-	PQDMEM2	12380	8	.02000							
2789-	PQDMEM2	12381	8	.02000							
2790-	PQDMEM2	12382	8	.02000							
2791-	PQDMEM2	12383	8	.02000							
2792-	PQDMEM2	12384	8	.02000							
2793-	PQDMEM2	12385	8	.02000							
2794-	PQDMEM2	12386	8	.02000							
2795-	PQDMEM2	12387	8	.02000							
2796-	PQDMEM2	12388	8	.02000							
2797-	PQDMEM2	12389	8	.02000							
2798-	PQDMEM2	12390	8	.02000							
2799-	PQDMEM2	12391	8	.02000							
2800-	PQDMEM2	12392	8	.02000							

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

CARD				S O F T E D   B U L K   C A T A   E C H O									
CDUNT	1	2	3	4	5	6	7	8	9	10			
2801-	PQD	MEM2 12393	8	.02000									
2802-	PQD	MEM2 12394	8	.02000									
2803-	PQD	MEM2 12395	8	.02000									
2804-	PQD	MEM2 12396	8	.02000									
2805-	PQD	MEM2 12397	8	.02000									
2806-	PQD	MEM2 12398	8	.02000									
2807-	PQD	MEM2 12399	8	.02000									
2808-	PQD	MEM2 12400	8	.02000									
2809-	PQD	MEM2 12401	8	.02000									
2810-	PQD	MEM2 12402	8	.02000									
2811-	PQD	MEM2 12403	8	.02000									
2812-	PQD	MEM2 12404	8	.02000									
2813-	PQD	MEM2 12405	8	.02000									
2814-	PQD	MEM2 12406	8	.02000									
2815-	PQD	MEM2 12407	8	.02000									
2816-	PQD	MEM2 12408	8	.02000									
2817-	PQD	MEM2 12409	8	.02000									
2818-	PQD	MEM2 12410	8	.02000									
2819-	PQD	MEM2 12411	8	.02000									
2820-	PQD	MEM2 12412	8	.02000									
2821-	PQD	MEM2 12413	8	.02000									
2822-	PQD	MEM2 12414	8	.02000									
2823-	PQD	MEM2 12415	8	.02000									
2824-	PQD	MEM2 12416	8	.02000									
2825-	PQD	MEM2 12417	8	.02000									
2826-	PQD	MEM2 12418	8	.02000									
2827-	PQD	MEM2 12419	8	.02000									
2828-	PQD	MEM2 12420	8	.02000									
2829-	PQD	MEM2 12421	8	.02000									
2830-	PQD	MEM2 12422	8	.02000									
2831-	PQD	MEM2 12423	8	.02000									
2832-	PQD	MEM2 12424	8	.02000									
2833-	PQD	MEM2 12425	8	.02000									
2834-	PQD	MEM2 12426	8	.02000									
2835-	PQD	MEM2 12427	8	.02000									
2836-	PQD	MEM2 12428	8	.02000									
2837-	PQD	MEM2 12429	8	.02000									
2838-	PQD	MEM2 12430	8	.02000									
2839-	PQD	MEM2 12431	8	.02000									
2840-	PQD	MEM2 12432	8	.02000									
2841-	PQD	MEM2 12600	8	.02000									
2842-	PQD	MEM2 12601	8	.02000									
2843-	PQD	MEM2 12602	8	.02000									
2844-	PQD	MEM2 12603	8	.02000									
2845-	PQD	MEM2 12604	8	.02000									
2846-	PQD	MEM2 12605	8	.02000									
2847-	PQD	MEM2 12606	8	.02000									
2848-	PQD	MEM2 12607	8	.02000									
2849-	PQD	MEM2 12608	8	.02000									
2850-	PQD	MEM2 12609	8	.02000									



PHASE 1(SYM,CASE)  
ORIGINAL FUSELAGE

CARD		S O R T E D   B U L K   D A T A   E C H O																			
COUNT	.	1	..	2	..	3	..	4	..	5	..	6	..	7	..	8	..	9	..	10	.
2851-	PQD	MEM2	12610	8				.02000													
2852-	PQD	MEM2	12611	8				.02000													
2853-	PQD	MEM2	12612	8				.02000													
2854-	PQD	MEM2	12613	8				.02000													
2855-	PQD	MEM2	12614	8				.02000													
2856-	PQD	MEM2	12615	8				.02000													
2857-	PQD	MEM2	12616	8				.02000													
2858-	PQD	MEM2	12617	8				.02000													
2859-	PQD	MEM2	12618	8				.02000													
2860-	PQD	MEM2	12619	8				.02000													
2861-	PQD	MEM2	12621	8				.02000													
2862-	PQD	MEM2	12622	8				.02000													
2863-	PQD	MEM2	12623	8				.02000													
2864-	PQD	MEM2	12624	8				.02000													
2865-	PQD	MEM2	12625	8				.02000													
2866-	PQD	MEM2	12626	8				.02000													
2867-	PQD	MEM2	12627	8				.02000													
2868-	PQD	MEM2	12628	8				.02000													
2869-	PQD	MEM2	12629	8				.02000													
2870-	PQD	MEM2	12650	18				.375													
2871-	PQD	MEM2	12651	18				.375													
2872-	PQD	MEM2	12652	18				.375													
2873-	PQD	MEM2	12653	18				.375													
2874-	PQD	MEM2	12654	18				.375													
2875-	PQD	MEM2	12655	18				.375													
2876-	PQD	MEM2	12656	8				.02000													
2877-	PQD	MEM2	12657	8				.02000													
2878-	PQD	MEM2	12658	8				.02000													
2879-	PQD	MEM2	12659	8				.02000													
2880-	PQD	MEM2	12700	8				.01600													
2881-	PQD	MEM2	12701	8				.01600													
2882-	PQD	MEM2	12702	8				.01600													
2883-	PQD	MEM2	12703	8				.01600													
2884-	PQD	MEM2	12704	8				.01600													
2885-	PQD	MEM2	12705	8				.01600													
2886-	PS	SHEAR	10178	6				.04000													
2887-	PS	SHEAR	10179	6				.04000													
2888-	PS	SHEAR	10287	6				.04000													
2889-	PS	SHEAR	10288	6				.04000													
2890-	PS	SHEAR	10289	6				.04000													
2891-	PS	SHEAR	10290	6				.04000													
2892-	PS	SHEAR	10291	6				.04000													
2893-	PS	SHEAR	10292	6				.04000													
2894-	PS	SHEAR	10293	6				.04000													
2895-	PS	SHEAR	10294	6				.04000													
2896-	PS	SHEAR	10295	6				.04000													
2897-	PS	SHEAR	10296	6				.04000													
2898-	PS	SHEAR	10351	6				.12500													
2899-	PS	SHEAR	10352	6				.12500													
2900-	PS	SHEAR	10353	6				.12500													

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

CARD				S O R T E D   B U L K   D A T A   E C H O									
COUNT	1	2	3	4	5	6	7	8	9	10			
2901-	PSHEAR	10354	6	.21600									
2902-	PSHEAR	10355	6	.09100									
2903-	PSHEAR	10356	6	.09100									
2904-	PSHEAR	10357	6	.09100									
2905-	PSHEAR	10358	6	.09100									
2906-	PSHEAR	10401	6	.12500									
2907-	PSHEAR	10402	6	.12500									
2908-	PSHEAR	10403	6	.12500									
2909-	PSHEAR	10404	6	.12500									
2910-	PSHEAR	10551	6	.12500									
2911-	PSHEAR	10552	6	.12500									
2912-	PSHEAR	10553	6	.12500									
2913-	PSHEAR	10554	6	.21600									
2914-	PSHEAR	10555	6	.09100									
2915-	PSHEAR	10556	6	.09100									
2916-	PSHEAR	10557	6	.09100									
2917-	PSHEAR	10558	6	.09100									
2918-	PSHEAR	10651	6	.12500									
2919-	PSHEAR	10652	6	.12500									
2920-	PSHEAR	10653	6	.12500									
2921-	PSHEAR	10654	6	.21600									
2922-	PSHEAR	10655	6	.09100									
2923-	PSHEAR	10656	6	.09100									
2924-	PSHEAR	10657	6	.09100									
2925-	PSHEAR	10658	6	.09100									
2926-	PSHEAR	10751	6	.12500									
2927-	PSHEAR	10752	6	.12500									
2928-	PSHEAR	10753	6	.12500									
2929-	PSHEAR	10754	6	.21600									
2930-	PSHEAR	10755	6	.09100									
2931-	PSHEAR	10756	6	.09100									
2932-	PSHEAR	10757	6	.09100									
2933-	PSHEAR	10758	6	.09100									
2934-	PSHEAR	10851	6	.12500									
2935-	PSHEAR	10852	6	.12500									
2936-	PSHEAR	10853	6	.12500									
2937-	PSHEAR	10854	6	.21600									
2938-	PSHEAR	10855	6	.09100									
2939-	PSHEAR	10856	6	.09100									
2940-	PSHEAR	10857	6	.09100									
2941-	PSHEAR	10858	6	.09100									
2942-	PSHEAR	10951	6	.04000									
2943-	PSHEAR	10952	6	.04000									
2944-	PSHEAR	10953	6	.04000									
2945-	PSHEAR	10954	6	.13100									
2946-	PSHEAR	10959	6	.09100									
2947-	PSHEAR	10960	6	.09100									
2948-	PSHEAR	10961	6	.09100									
2949-	PSHEAR	10962	6	.09100									
2950-	PSHEAR	11040	6	.04000									

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

CARD		S O R T E D   B U L K   D A T A   E C H O									
COUNT	1	2	3	4	5	6	7	8	9	10	
2951-	PSHEAR	11041	6	.04000							
2952-	PSHEAR	11042	6	.04000							
2953-	PSHEAR	11043	6	.13100							
2954-	PSHEAR	11048	6	.09100							
2955-	PSHEAR	11049	6	.09100							
2956-	PSHEAR	11050	6	.09100							
2957-	PSHEAR	11051	6	.09100							
2958-	PSHEAR	11140	6	.04000							
2959-	PSHEAR	11141	6	.04000							
2960-	PSHEAR	11142	6	.04000							
2961-	PSHEAR	11143	6	.13100							
2962-	PSHEAR	11145	6	.09100							
2963-	PSHEAR	11146	6	.09100							
2964-	PSHEAR	11147	6	.09100							
2965-	PSHEAR	11148	6	.09100							
2966-	PSHEAR	11240	6	.12500							
2967-	PSHEAR	11241	6	.12500							
2968-	PSHEAR	11242	6	.12500							
2969-	PSHEAR	11243	6	.21600							
2970-	PSHEAR	11244	6	.09100							
2971-	PSHEAR	11245	6	.09100							
2972-	PSHEAR	11246	6	.09100							
2973-	PSHEAR	11247	6	.09100							
2974-	PSHEAR	11248	6	.09100							
2975-	PSHEAR	11340	6	.12500							
2976-	PSHEAR	11341	6	.12500							
2977-	PSHEAR	11342	6	.12500							
2978-	PSHEAR	11343	6	.21600							
2979-	PSHEAR	11344	6	.09100							
2980-	PSHEAR	11345	6	.09100							
2981-	PSHEAR	11346	6	.09100							
2982-	PSHEAR	11347	6	.09100							
2983-	PSHEAR	11348	6	.09100							
2984-	PSHEAR	11440	6	.04000							
2985-	PSHEAR	11441	6	.04000							
2986-	PSHEAR	11442	6	.04000							
2987-	PSHEAR	11443	6	.13100							
2988-	PSHEAR	11444	6	.09100							
2989-	PSHEAR	11445	6	.09100							
2990-	PSHEAR	11446	6	.09100							
2991-	PSHEAR	11447	6	.09100							
2992-	PSHEAR	11540	6	.09100							
2993-	PSHEAR	11541	6	.09100							
2994-	PSHEAR	11542	6	.09100							
2995-	PSHEAR	11543	6	.09100							
2996-	PSHEAR	11640	6	.04000							
2997-	PSHEAR	11641	6	.04000							
2998-	PSHEAR	11642	6	.04000							
2999-	PSHEAR	11643	6	.13100							
3000-	PSHEAR	11644	6	.09100							

PHASE 1(SYN.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   C A T A   E C H O										
CARD	1	2	3	4	5	6	7	8	9	10
3001- PSHEAR	11645	6		.09100						
3002- PSHEAR	11646	6		.09100						
3003- PSHEAR	11647	6		.09100						
3004- PSHEAR	11740	6		.04000						
3005- PSHEAR	11741	6		.04000						
3006- PSHEAR	11742	6		.04000						
3007- PSHEAR	11743	6		.13100						
3008- PSHEAR	11744	6		.09100						
3009- PSHEAR	11745	6		.09100						
3010- PSHEAR	11746	6		.09100						
3011- PSHEAR	11747	6		.09100						
3012- PSHEAR	11860	6		.04000						
3013- PSHEAR	11861	6		.04000						
3014- PSHEAR	11862	6		.04000						
3015- PSHEAR	11863	6		.04000						
3016- PSHEAR	11864	6		.08000						
3017- PSHEAR	11865	6		.04000						
3018- PSHEAR	11866	6		.04000						
3019- PSHEAR	11867	6		.04000						
3020- PSHEAR	11868	6		.04000						
3021- PSHEAR	11869	6		.04000						
3022- PSHEAR	11870	6		.04000						
3023- PSHEAR	11871	6		.04000						
3024- PSHEAR	11872	6		.04000						
3025- PSHEAR	11873	6		.04000						
3026- PSHEAR	11874	6		.04000						
3027- PSHEAR	11875	6		.04000						
3028- PSHEAR	11876	6		.04000						
3029- PSHEAR	11877	6		.04000						
3030- PSHEAR	11878	6		.04000						
3031- PSHEAR	11879	6		.04000						
3032- PSHEAR	11940	6		.08000						
3033- PSHEAR	11941	6		.04000						
3034- PSHEAR	11942	6		.04000						
3035- PSHEAR	11943	6		.04000						
3036- PSHEAR	11944	6		.04000						
3037- PSHEAR	11945	6		.08000						
3038- PSHEAR	11946	6		.04000						
3039- PSHEAR	11947	6		.04000						
3040- PSHEAR	11948	6		.04000						
3041- PSHEAR	12630	16		.02000						
3042- PSHEAR	12631	16		.02000						
3043- PSHEAR	12632	16		.02000						
3044- PSHEAR	12633	16		.02000						
3045- PSHEAR	12634	16		.02000						
3046- PSHEAR	12635	16		.02000						
3047- PSHEAR	12636	16		.02000						
3048- PSHEAR	12637	16		.02000						
3049- PSHEAR	12638	16		.02000						
3050- PSHEAR	12639	16		.02000						

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D   B U L K   D A T A   E C H O											
CARD	COUNT	1	2	3	4	5	6	7	8	9	10
3051-	PSHEAR	12640	16		.04000						
3052-	PSHEAR	12641	16		.04000						
3053-	PSHEAR	12706	16		.01600						
3054-	PSHEAR	12707	16		.03200						
3055-	PSHEAR	12708	16		.03200						
3056-	PTRMEM	10180	4		.04000						
3057-	PTRMEM	10297	4		.04000						
3058-	PTRMEM	12067	4		.03200						
3059-	PTRMEM	12070	4		.032						
3060-	PTRMEM	12278	8		.02500						
3061-	PTRMEM	12620	8		.02000						
3062-	SPC1	200	1		107	THRU	109				
3063-	SPC1	200	1		116	THRU	119				
3064-	SPC1	200	1		121	THRU	124				
3065-	SPC1	200	1		126		130				
3066-	SPC1	200	1		208	THRU	211				
3067-	SPC1	200	1		214	THRU	217				
3068-	SPC1	200	1		225	226	228	229	231	232	
3069-	SPC1	200	1		234	235	237	238	240	241	
3070-	SPC1	200	1		506	THRU	509				
3071-	SPC1	200	1		511	513	515	517			
3072-	SPC1	200	1		606	THRU	609				
3073-	SPC1	200	1		611	613	615	617			
3074-	SPC1	200	1		706	THRU	709				
3075-	SPC1	200	1		711	713	715	717			
3076-	SPC1	200	1		806	THRU	809				
3077-	SPC1	200	1		811	813	815	817			
3078-	SPC1	200	1		912	THRU	914				
3079-	SPC1	200	1		916	918	920	922			
3080-	SPC1	200	1		1012	THRU	1014				
3081-	SPC1	200	1		1016	1018	1020	1022			
3082-	SPC1	200	1		1112	THRU	1114				
3083-	SPC1	200	1		1116	1118	1120	1122			
3084-	SPC1	200	1		1207	THRU	1209				
3085-	SPC1	200	1		1211	1213	1215	1217	1219		
3086-	SPC1	200	1		1307	THRU	1309				
3087-	SPC1	200	1		1311	1313	1315	1317	1319		
3088-	SPC1	200	1		1411	1413	1415	1417			
3089-	SPC1	200	1		1503	1505	1507	1509			
3090-	SPC1	200	1		1611	1613	1615	1617			
3091-	SPC1	200	1		1711	1713	1715	1717			
3092-	SPC1	200	1		1813	1815	1817	1819			
3093-	SPC1	200	1		1825	THRU	1827				
3094-	SPC1	200	1		1829	THRU	1831				
3095-	SPC1	200	1		1833	THRU	1835				
3096-	SPC1	200	1		1906	THRU	1913				
3097-	SPC1	200	1		2006	THRU	2009				
3098-	SPC1	200	1		2012	2013	2027	2028			
3099-	SPC1	200	1		2016	THRU	2019				
3100-	SPC1	200	1		2021	THRU	2024				

PHASE 1(SYM.CASE)  
ORIGINAL FUSELAGE

S O R T E D B U L K D A T A E C H O

CARD	1	2	3	4	5	6	7	8	9	10
3101- SPC1	200	1	2031	THRU	2034					
3102- SPC1	200	1	2036	THRU	2038					
3103- SPC1	200	5	318	760	1161	1824	1522			
3104- SPC1	200	6	1930							
3105- SPC1	200	45	230	518	618	718	818	923		
3106- SPC1	200	45	1023	1123	1220	1320	1418	1510		
3107- SPC1	200	45	1618	1660	1718					
3108- SPC1	200	46	1821	1934						
3109- SPC1	200	56	151	THRU	169					
3110- SPC1	200	56	305	310	312	314	316	1162		
3111- SPC1	200	56	751	THRU	759					
3112- SPC1	200	56	1151	THRU	1160					
3113- SPC1	200	56	1201	1206	1221					
3114- SPC1	200	56	1905	1918	1919	1920	1921			
3115- SPC1	200	56	1923	THRU	1927					
3116- SPC1	200	56	1929							
3117- SPC1	200	456	101	THRU	131					
3118- SPC1	200	456	201	THRU	229					
3119- SPC1	200	456	231	THRU	242					
3120- SPC1	200	456	301	THRU	304					
3121- SPC1	200	456	401							
3122- SPC1	200	456	501	THRU	517					
3123- SPC1	200	456	601	THRU	617					
3124- SPC1	200	456	701	THRU	717					
3125- SPC1	200	456	801	THRU	817					
3126- SPC1	200	456	901	THRU	905					
3127- SPC1	200	456	910	THRU	922					
3128- SPC1	200	456	1001	THRU	1005					
3129- SPC1	200	456	1010	THRU	1022					
3130- SPC1	200	456	1101	THRU	1105					
3131- SPC1	200	456	1110	THRU	1122					
3132- SPC1	200	456	1202	THRU	1205					
3133- SPC1	200	456	1207	THRU	1219					
3134- SPC1	200	456	1301	THRU	1319					
3135- SPC1	200	456	1321	1419						
3136- SPC1	200	456	1401	THRU	1417					
3137- SPC1	200	456	1501	THRU	1509					
3138- SPC1	200	456	1511	THRU	1519					
3139- SPC1	200	456	1601	THRU	1617					
3140- SPC1	200	456	1619	THRU	1620					
3141- SPC1	200	456	1651	THRU	1659					
3142- SPC1	200	456	1661	THRU	1665					
3143- SPC1	200	456	1701	THRU	1717					
3144- SPC1	200	456	1719	THRU	1720					
3145- SPC1	200	456	1721	THRU	1724					
3146- SPC1	200	456	1800							
3147- SPC1	200	456	1801	THRU	1815					
3148- SPC1	200	456	1817	THRU	1820					
3149- SPC1	200	456	1822	THRU	1823					
3150- SPC1	200	456	1825	THRU	1838					

PHASE 1 (SYM CASE)  
ORIGINAL FUSELAGE

S O R T E C B U L K D A T A E C H O										
CARD	1	2	3	4	5	6	7	8	9	10
3151- SPC1	200	456	1901	THRU	1904					
3152- SPC1	200	456	1906	THRU	1917					
3153- SPC1	200	456	1928	1935	1936					
3154- SPC1	200	456	1931	THRU	1933					
3155- SPC1	200	456	2001	THRU	2042					
3156- SPC1	200	1456	306	THRU	309					
3157- SPC1	200	1456	311	313	315	317				
3158- SPC1	200	1456	406	THRU	409					
3159- SPC1	201	2	101	106	111	116	121	130		
3160- SPC1	201	2	131	201	207	213	219			
3161- SPC1	201	2	240	THRU	242					
3162- SPC1	201	2	301	306	406					
3163- SPC1	201	2	501	506	601	606	701	706		
3164- SPC1	201	2	801	806	901	911	1001	1011		
3165- SPC1	201	2	1101	1301	1321	1401	1406			
3166- SPC1	201	2	1111							
3167- SPC1	201	2	1511	1516	1601	1606	1651	1661		
3168- SPC1	201	2	1701	1706	1723	1724	1600			
3169- SPC1	201	2	1721	1802						
3170- SPC1	201	2	1801	1807	1821	1825	1829	1833		
3171- SPC1	201	2	1837	1901	1906	1910	1914			
3172- SPC1	201	2	1934	1936	2001	2006	2011	2016		
3173- SPC1	201	2	2021	2026	2031	2036	2040			
3174- SPC1	201	24	151	164	166	751	165			
3175- SPC1	201	24	1151	1162	1201	1221				
3176- SPC1	201	24	1927	1930						
3177- SPC1	201	246	2101	2115						
3178- SPC1	202	1	401							
3179- SPC1	202	3	116	121	130	213	240	241		
3180- SPC1	202	3	306	406	506	606	706	806		
3181- SPC1	202	3	1825	1829	1833	1906	1910			
3182- SPC1	202	3	2006	2016	2021	2031	2036			
3183- SPC1	202	13	101	106	111	131	165			
3184- SPC1	202	13	151	164	166	201	207	219		
3185- SPC1	202	13	242	301	501	601	701	751		
3186- SPC1	202	13	801	901	911	1001	1011			
3187- SPC1	202	13	1101	1111	1151	1162				
3188- SPC1	202	13	1201	1206	1221	1301	1306	1321		
3189- SPC1	202	13	1401	1406	1511	1516	1601	1606		
3190- SPC1	202	13	1651	1661	1701	1706	1723	1724		
3191- SPC1	202	13	1800	1801	1807	1837				
3192- SPC1	202	13	1901	1914	1927	1936				
3193- SPC1	202	13	2001	2011	2026	2040				
3194- SPC1	202	135	1821	1930	1934					
3195- SPC1	202	135	2101	2115						
3196- SPCADD	301	200	201							
3197- SPCADD	302	200	202							
3198- SUPORT	301	3	1800	1	1806	3				

ENDDATA

PHASE 1XANTI CASE#  
ORIGINAL FUSELAGE .

CARD COUNT	CASE CONTROL DECK ECHO
1	TITLE # PHASE 1XANTI CASE#
2	SUBTITLE # ORIGINAL FUSELAGE
3	ECHO # BOTH
4	MPC # 402
5	SPC # 302
6	METHOD # 1
7	RECIN BULK



PHASE 1XANTI CASE#  
ORIGINAL FUSELAGE

INPUT BULK DATA DECK ECHO

```

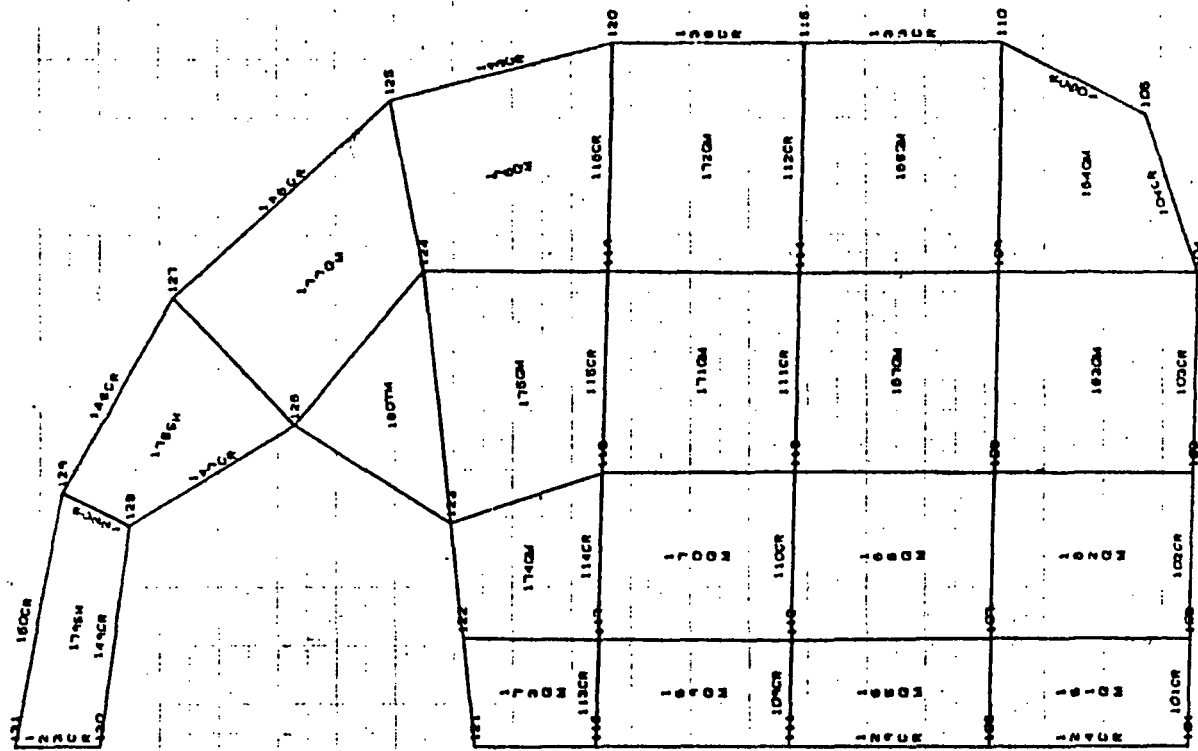
. 1 .. 2 .. 3 .. 4 .. 5 .. 6 .. 7 .. 8 .. 9 .. 10 .
$ CONVERT ORIGINAL SYMM FUSELAGE TO ORIGINAL ANTI FUSELAGE
/
/      1
/      3
/      7      8
/      10     11
/      1296   1299
/      2505
/      3198
ASET1      2      101      201      301      501      601      701      801
ASET1      2      241      506      1701     1833
ASET1      2      901      911      1011     1101     1111     1201     1321
ASET1      2      1401     1406     1516     1601     1606     1837     2001
ASET1      2      1800     1724
ASET1      2      2026     2040     2115
ASET1      3      1802
DMI        EQR      0      2      1      2      3      3
DMI        EQR      1      1      1.0    -48.432   68.25
DMI        EQR      2      1      1.0    -45.5    165.25
DMI        EQR      3      2     -12.5
PARAM      TPNAME   FUSAPI
SUPORT      301      2      1800      2      1806      3
ENDDATA

```

TOTAL COUNT# 22

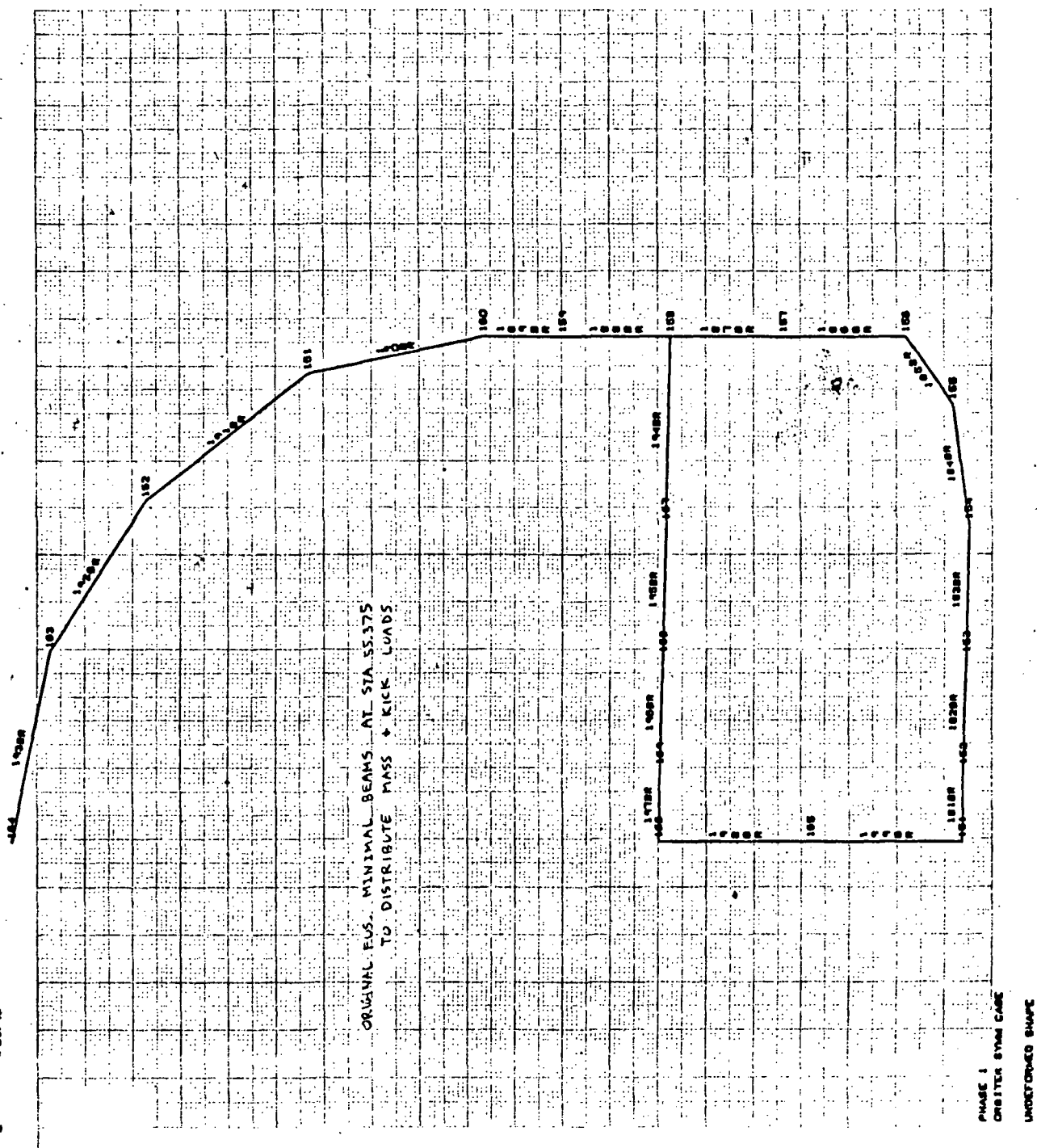
**Appendix B4**  
**PLOTS OF MEMBER DATA**  
**PHASE 1 ANALYSIS: MODEL I FUSELAGE**

9/20/75



ORIGINAL FVS  
FRAME 1  
STA 45.75

PHASE 1  
ORBITER SYMM CASE  
UNDEFORMED SHAPE

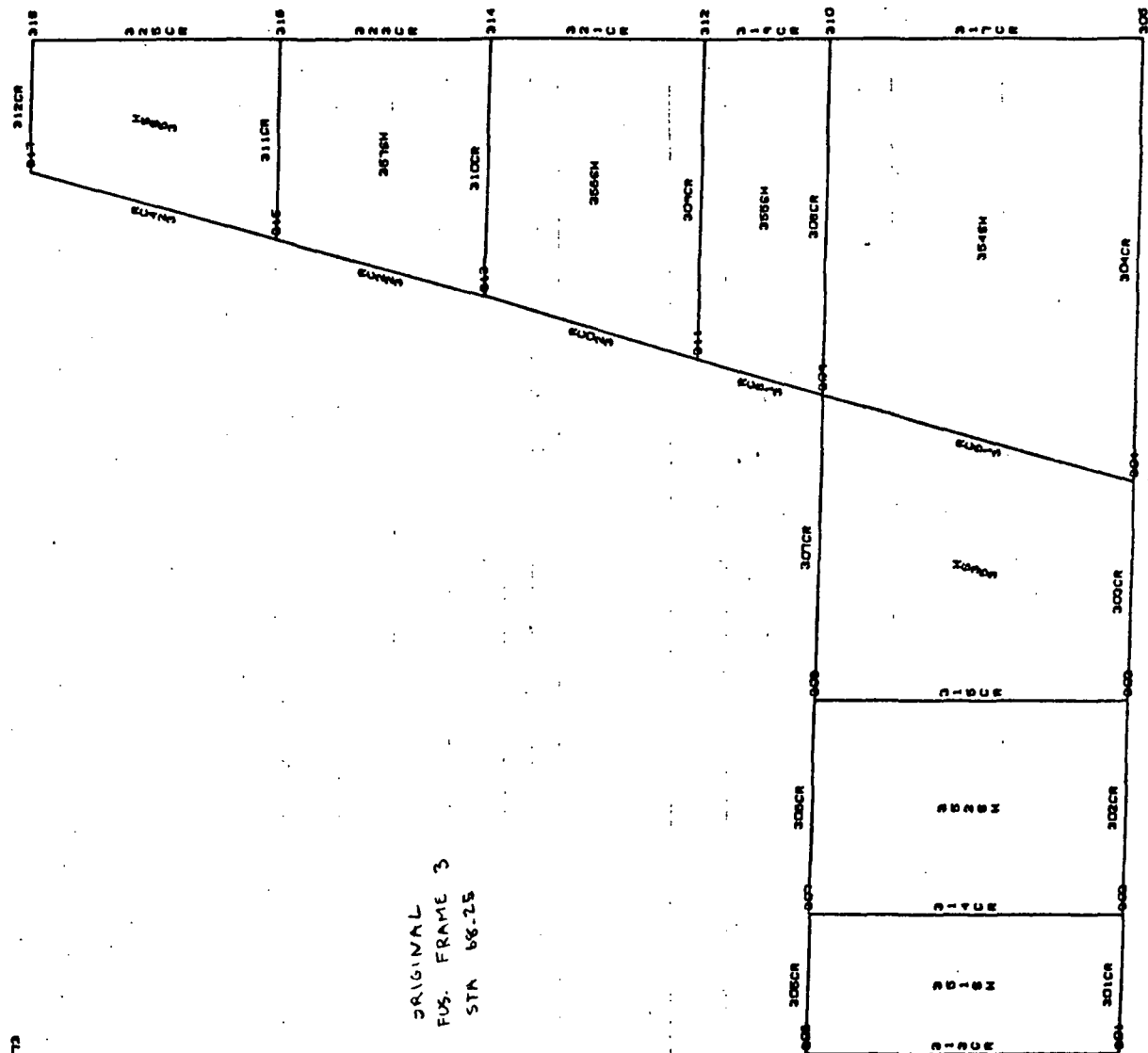




4 4/28/73

4

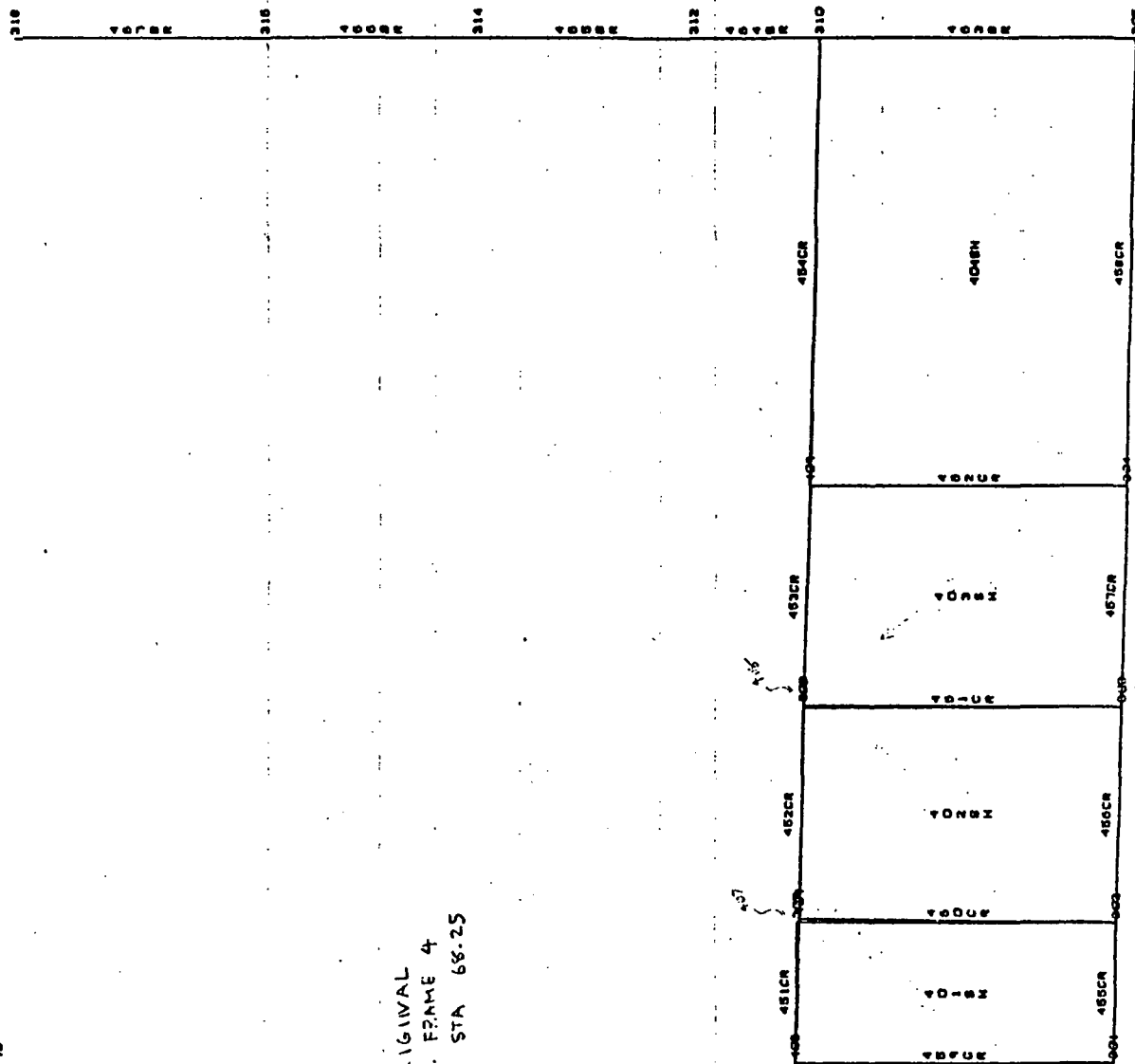
ORIGINAL  
FUS. FRAME 3  
STA 68.25



PHASE 1  
ORBITER SYMM CASE  
UNDISTORTED SHAPE

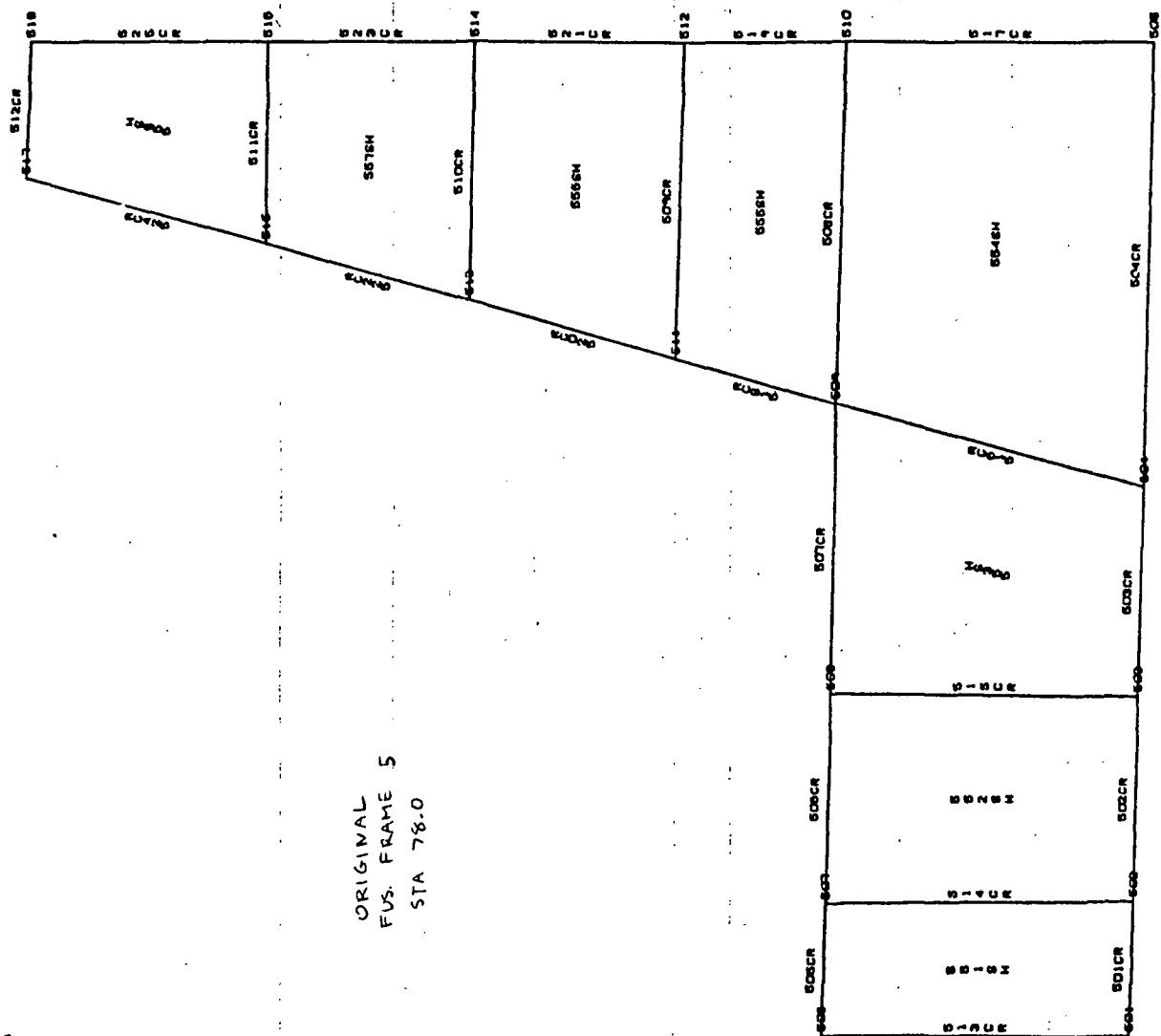
5 1/28/73

ORIGINAL  
FUS. FRAME 4  
STA 68.25



PHASE 1  
ORBITER SYM CASE  
UNDEFORMED SHAPE

ORIGINAL  
FUS. FRAME 5  
STA 78.0



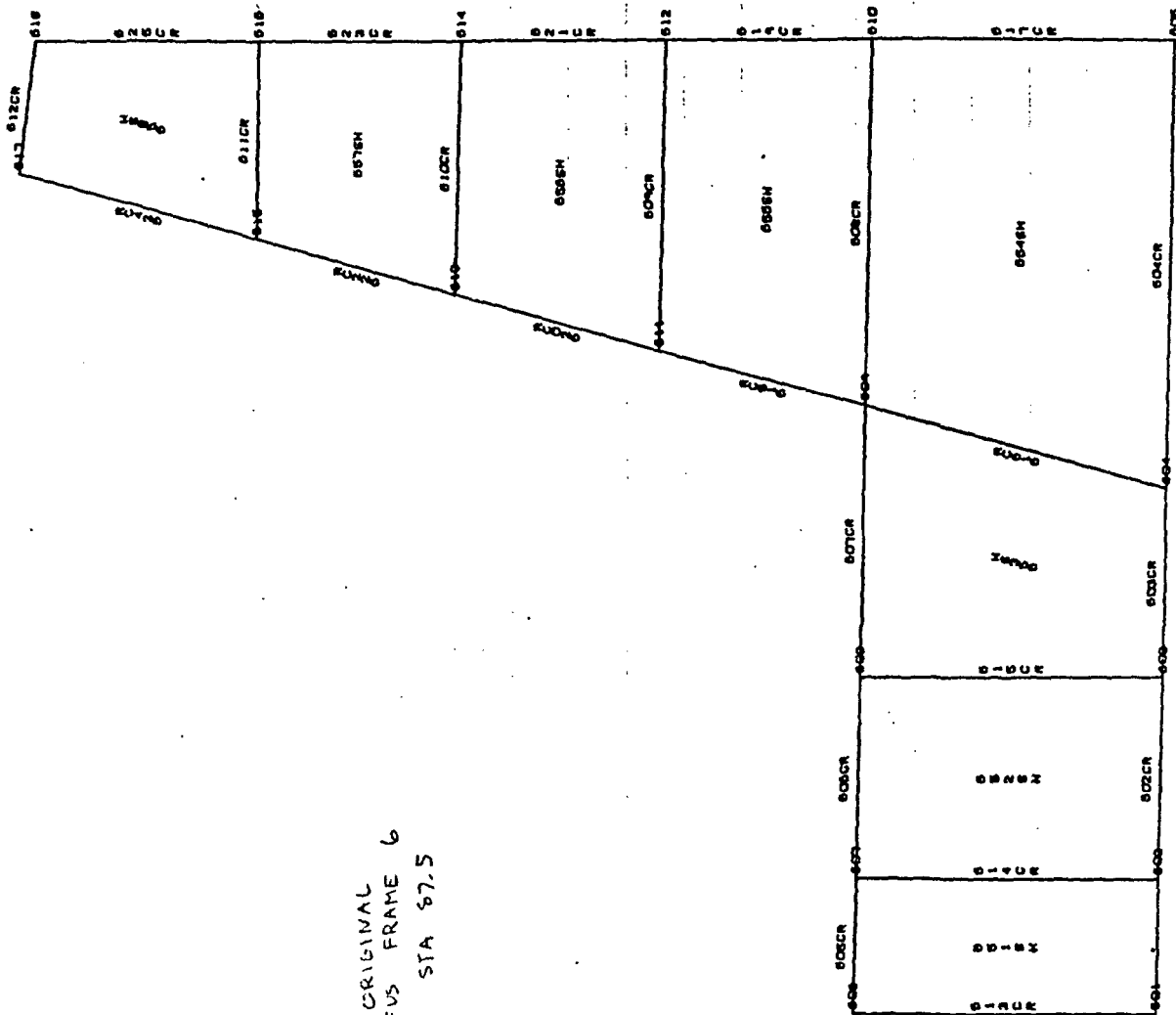
PHASE I  
ORBITER SYM CASE  
UNDEFORMED SHAPE



4/25/73

7

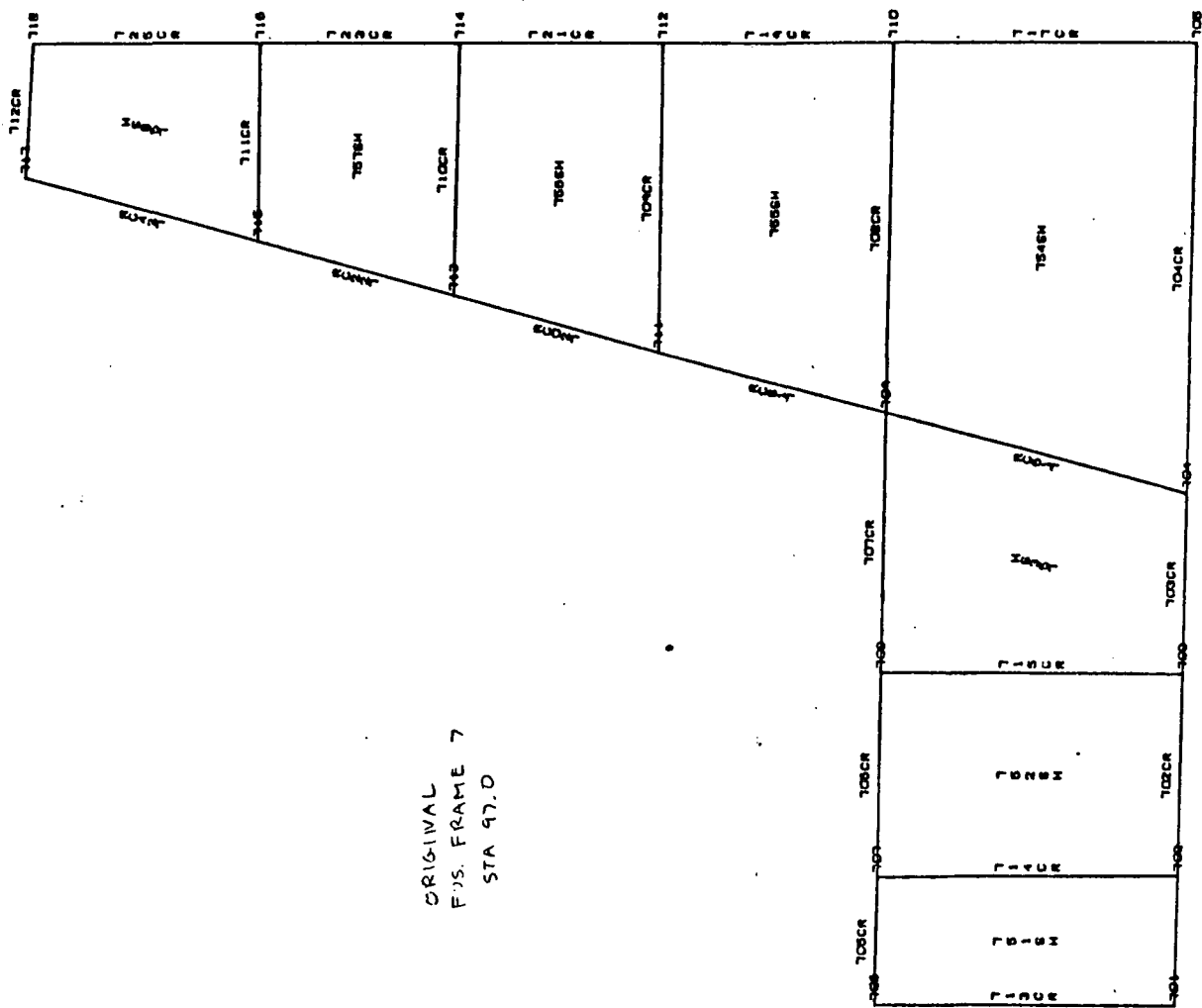
ORIGINAL  
FUS FRAME 6  
STA 67.5



PHASE 1  
ORBITER SYM CASE  
UNDEFORMED SHAPE

9/28/73

5



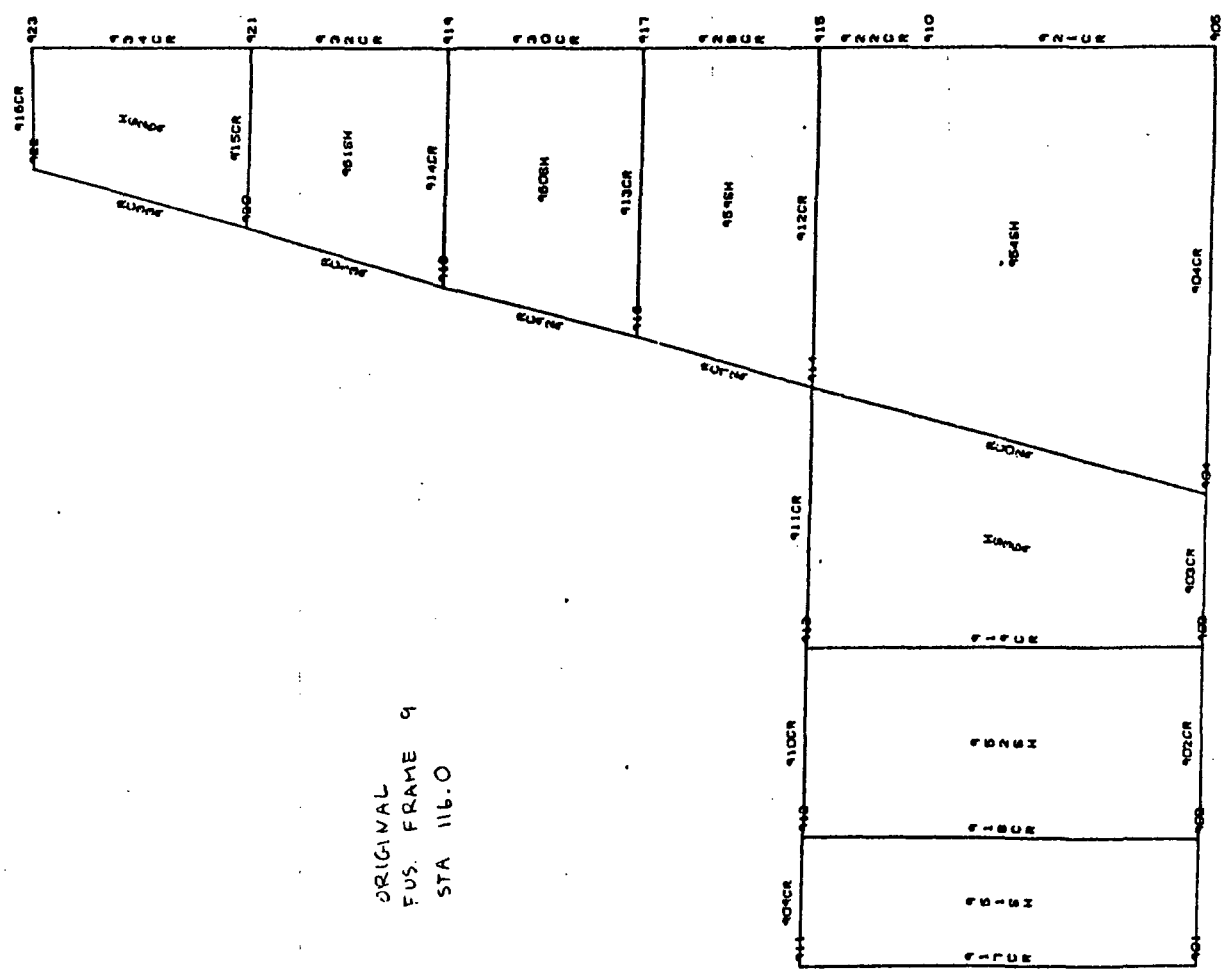
PHASE 1  
ORBITER SYM CASE  
UNDISTORTED SHAPE

ORIGINAL  
FUS. MINIMAL BEAMS AT STA 102+12  
TO DISTRIBUTE MASS + KICK LOADS

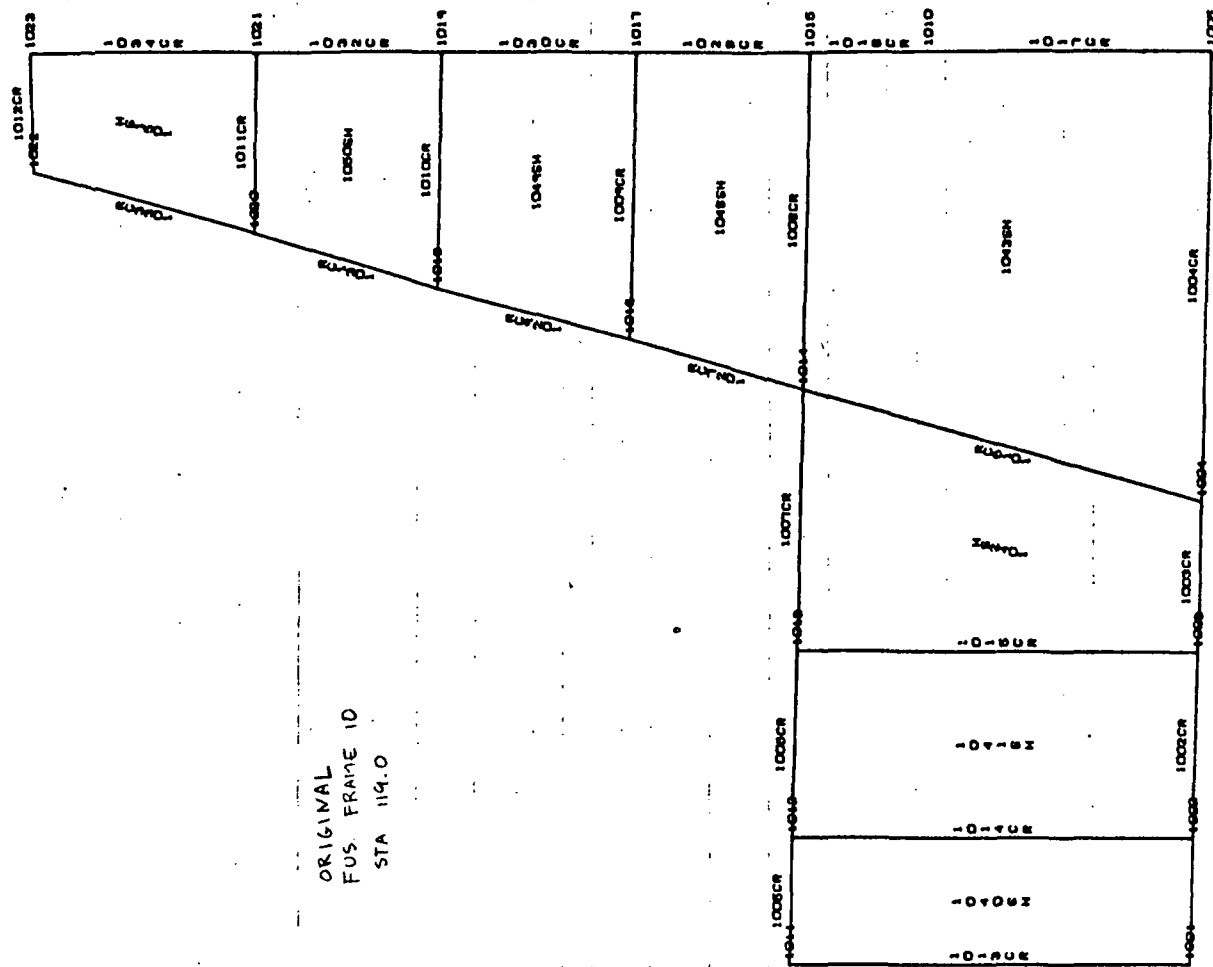
**B4-9**

PHASE I  
ORBITER SYSTEM CASE  
UNOBTAINED SHAPE

ORIGINAL  
FUS. FRAME 9  
STA 116.0



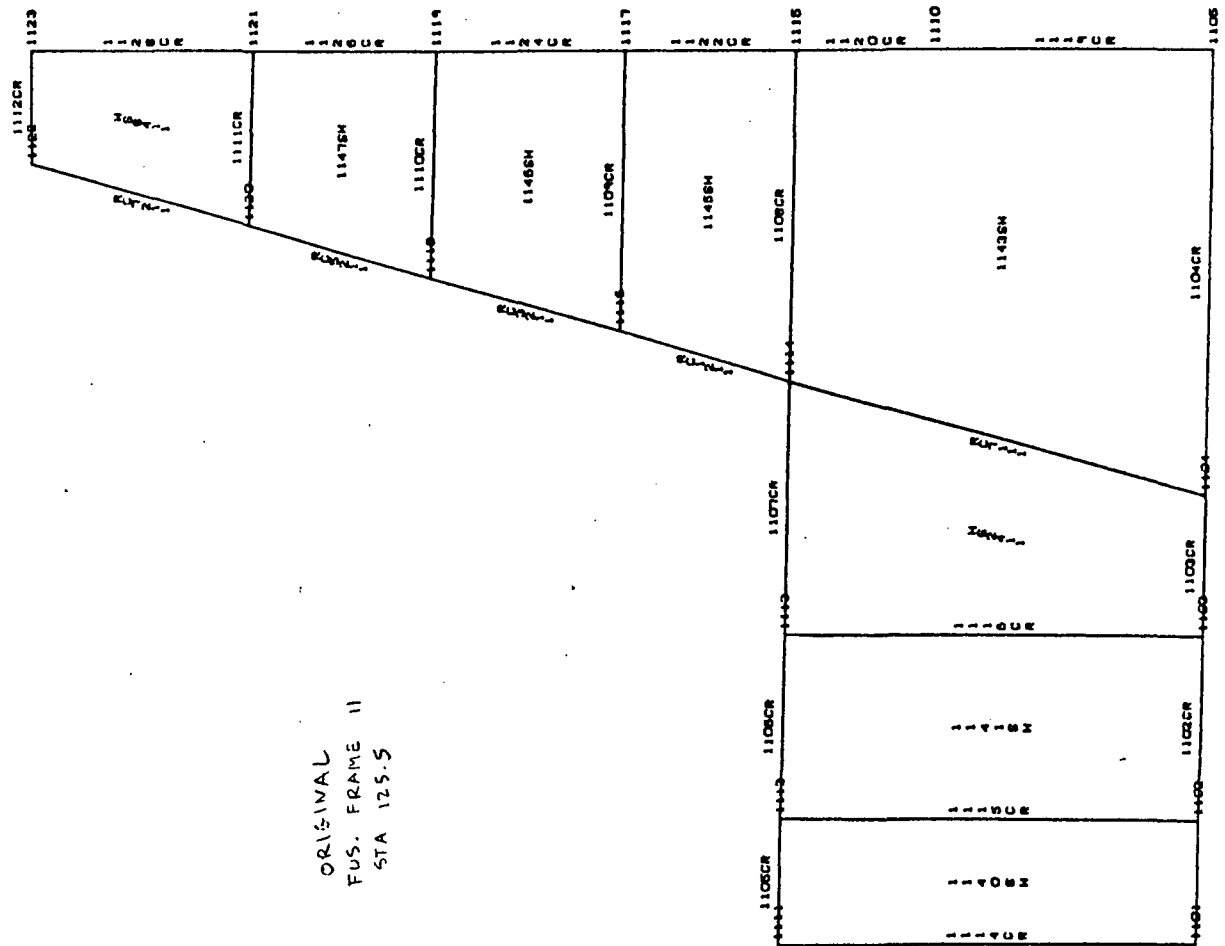
PHASE 1  
ORBITER SYMM CASE  
UNDEFORMED SHAPE



ORIGINAL  
FUS FRAME 10  
STA 119.0

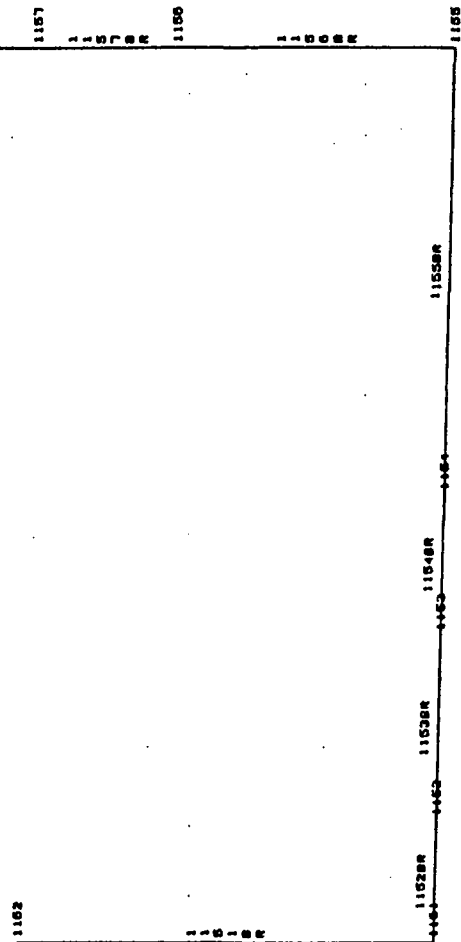
PHASE 1  
ORBITER SYM CASE  
UNDEFORMED SHAPE

ORIGINAL  
FUS. FRAME II  
STA 125.5



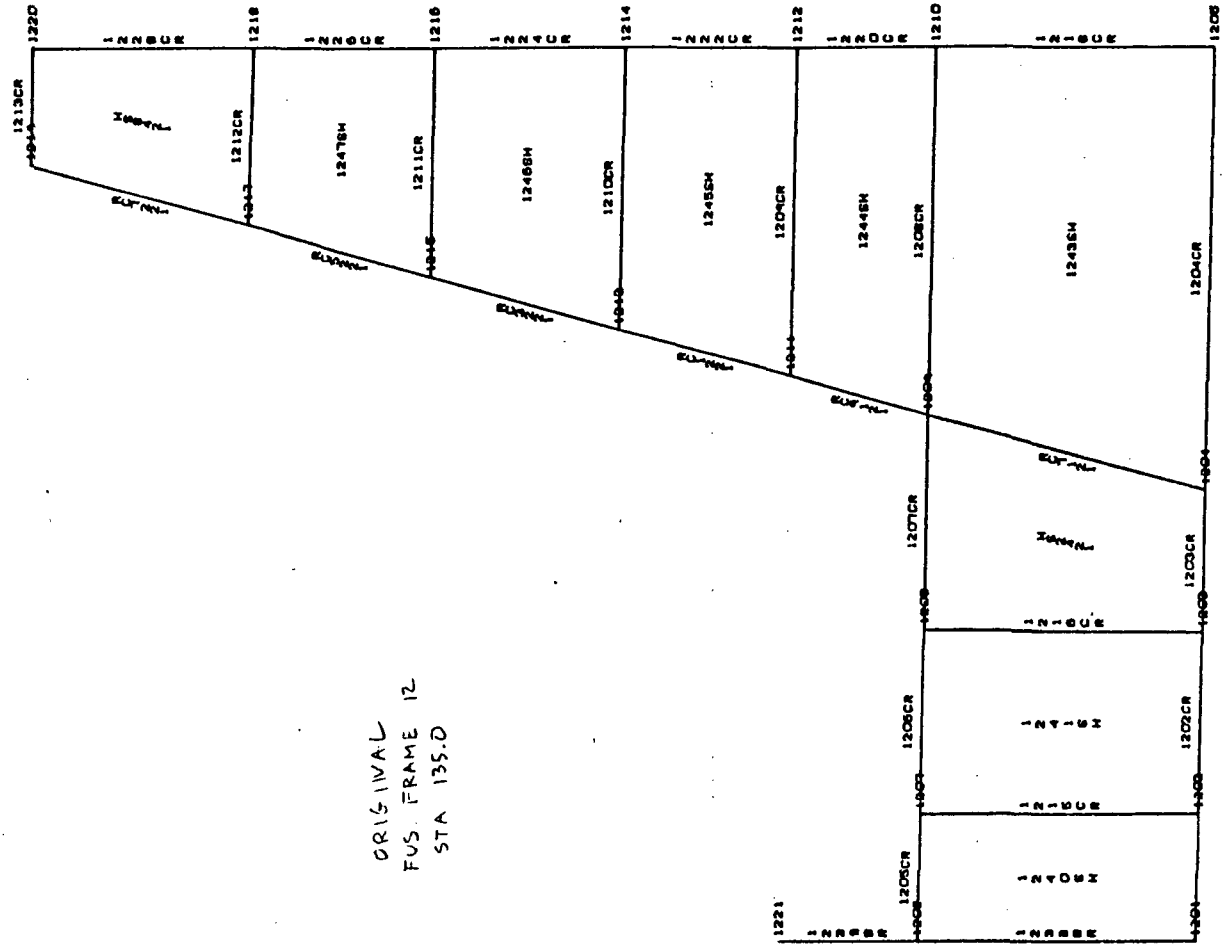
PHASE I  
ORBITER SYMM CASE  
UNDEFORMED SHAPE

ORIGINAL  
FUS. MINIMAL BEAMS AT STA 129  
TO DISTRIBUTE MASS & KICK LOADS



PHASE 1  
ORBITER SYMM CASE  
UNDEFORMED SHAPE

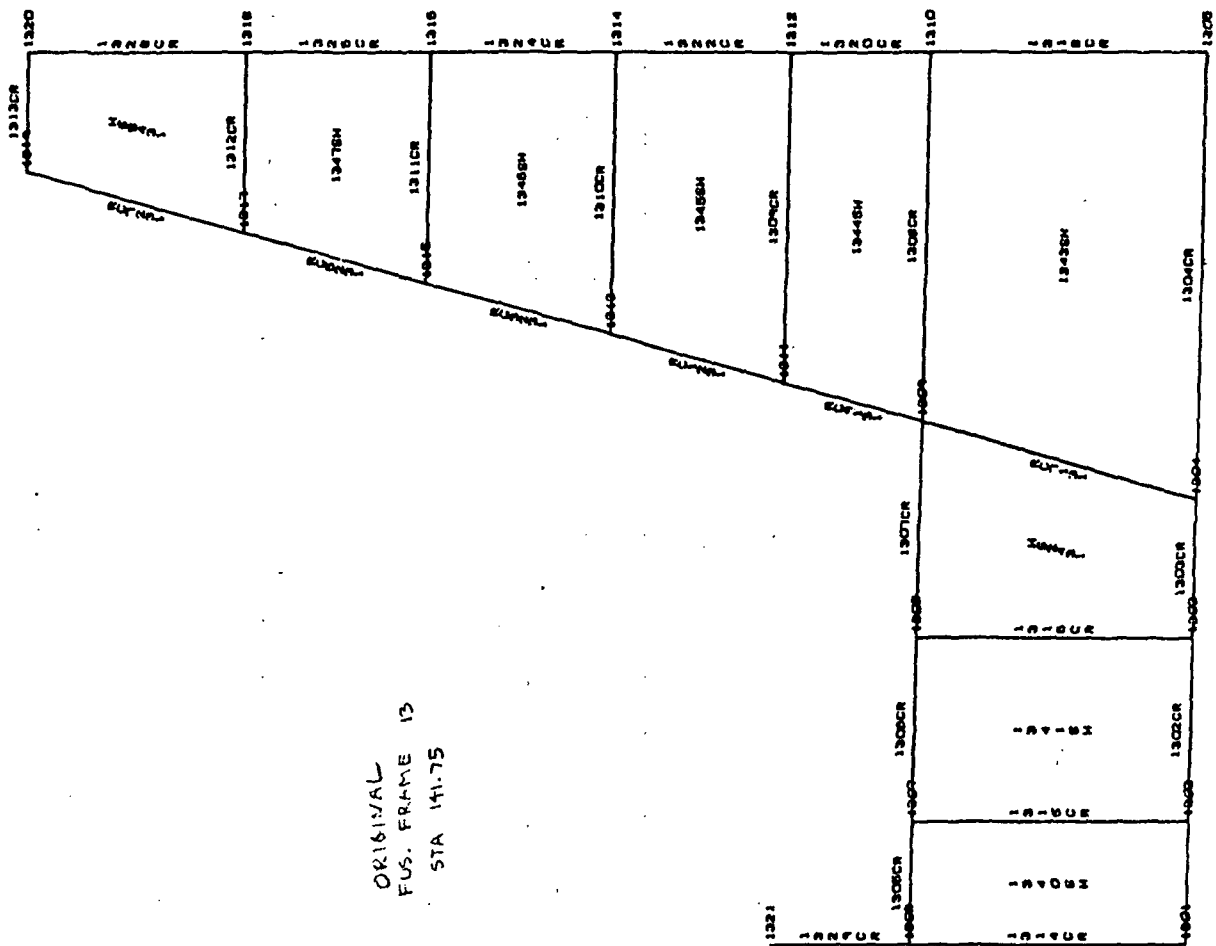




ORIGINAL  
FUS. FRAME 12  
STA 135.0

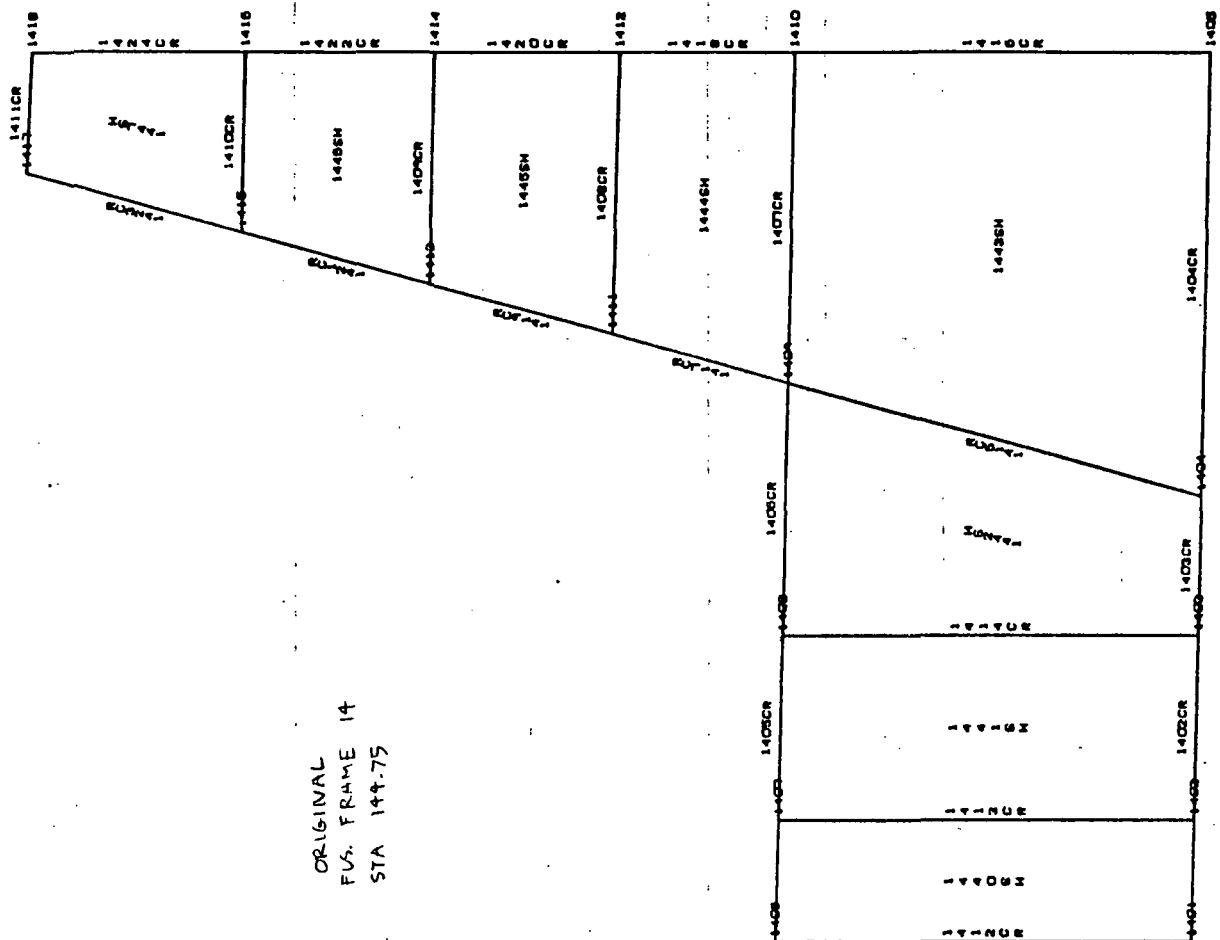
PHASE 1  
ORIGITER SYMM CASE  
UNDEFORMED SHAPE

ORIGINAL  
FUS. FRAME 13  
STA 141.75

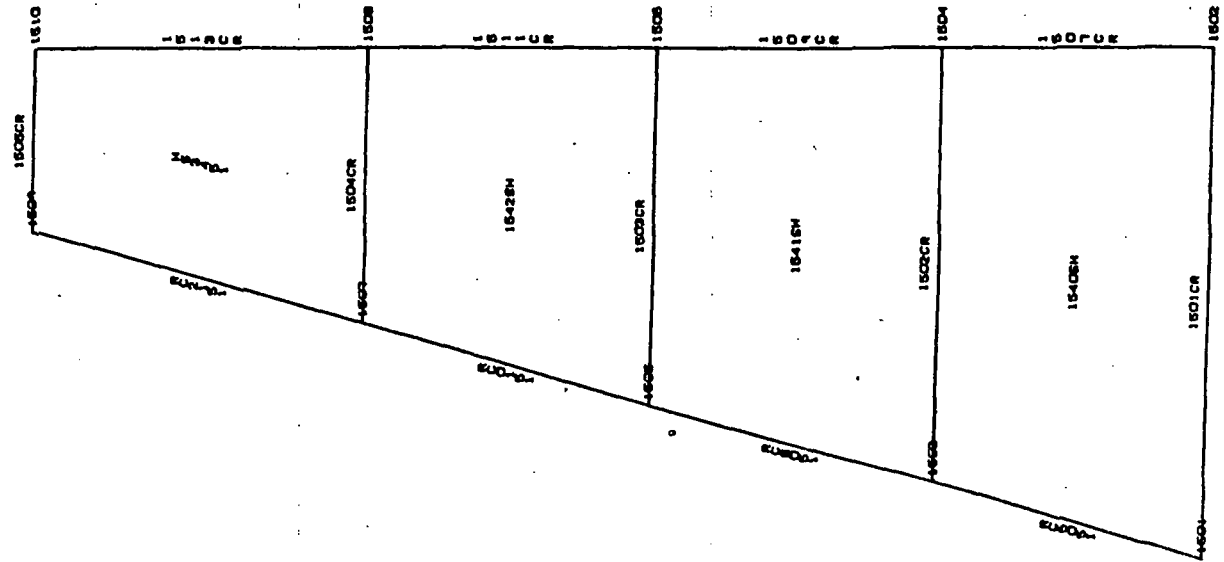


PHASE 1  
ORBITER STOW CASE  
UNDEFORMED SHAPE

ORIGINAL  
FVS. FRAME 14  
STA 144.75



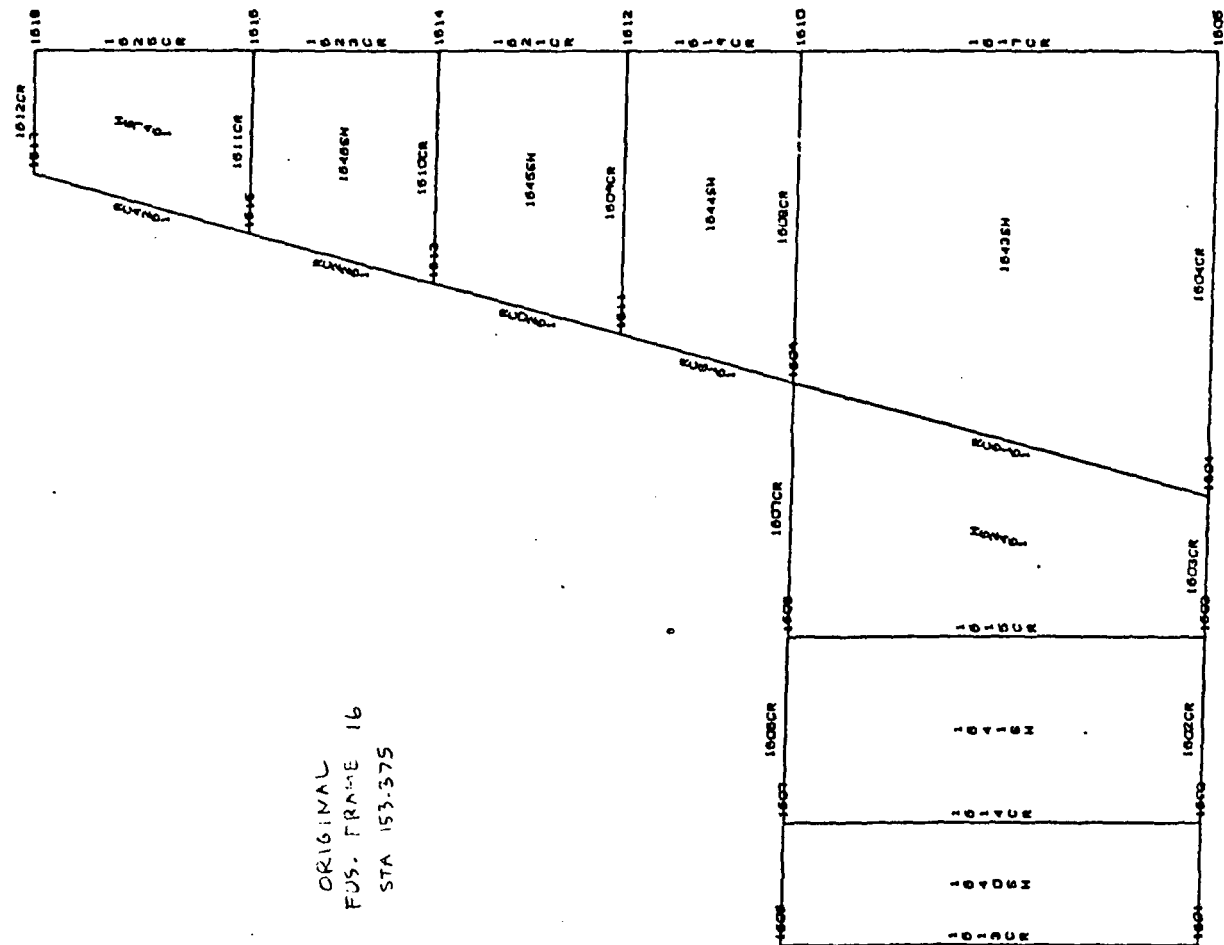
PHASE 1  
ORBITER SYN CASE  
UNDEFORMED SHAPE



ORIGINAL  
FUS. FRAME IS  
STA 150-375

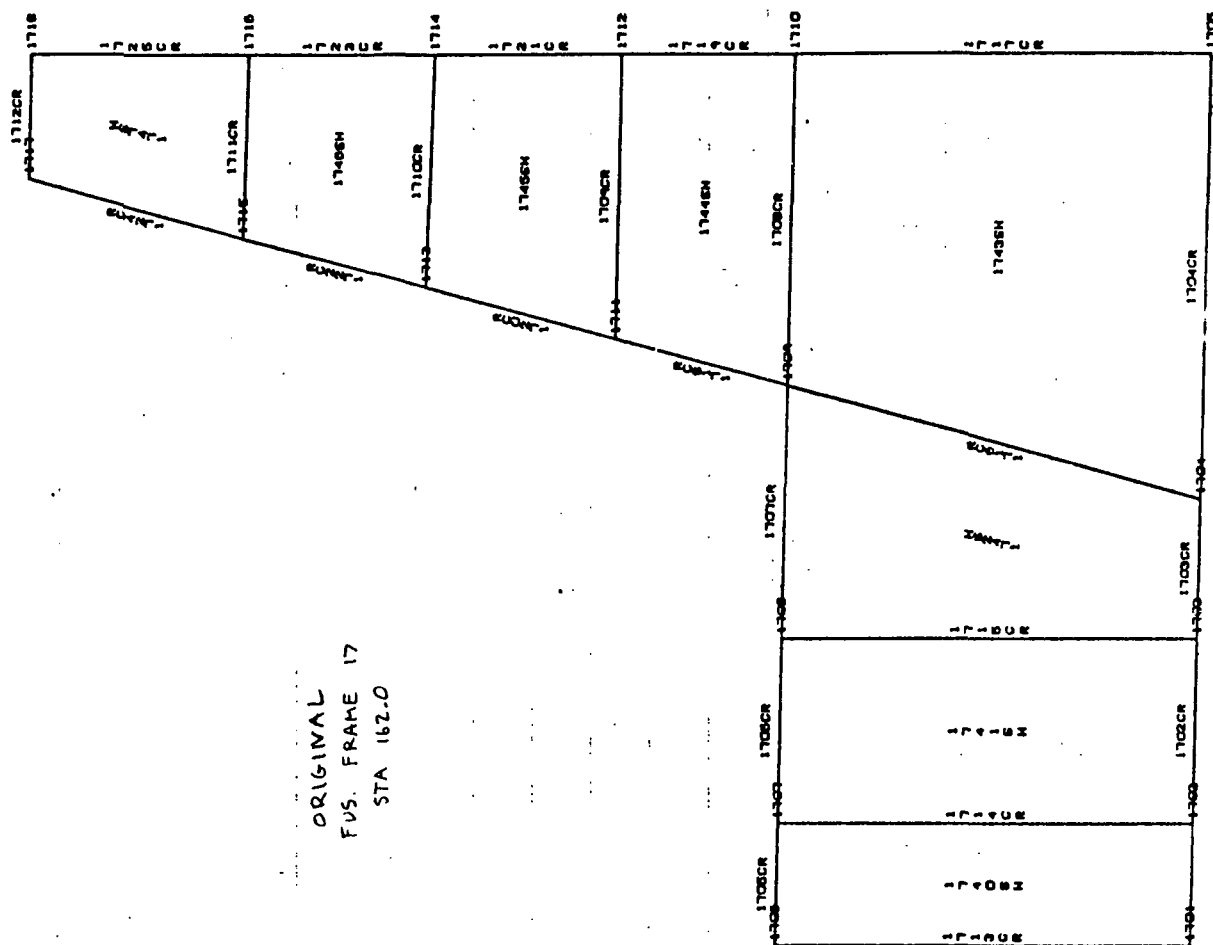
PHASE 1  
ORBITER SYM CASE  
UNDEFORMED SHAPE

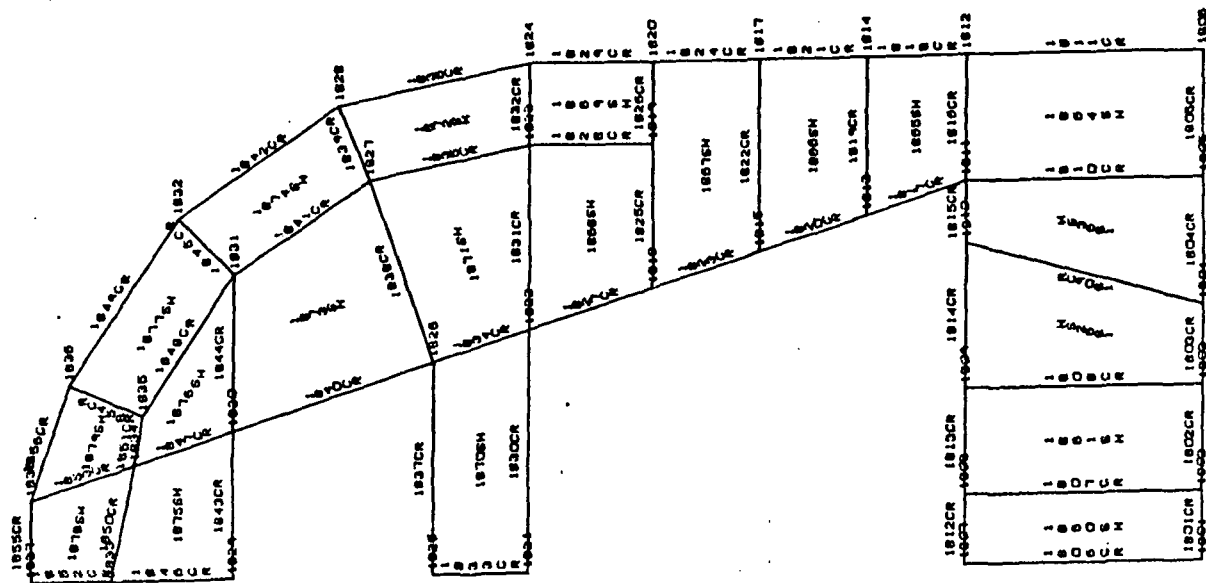
ORIGINAL  
FUS. FRAME 16  
STA 153.375



PHASE 1  
CRISTER SYMM CASE  
UNDEFORMED SHAPE

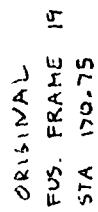
PHASE 1  
ORBITER SYRM CASE  
UNDEFORMED SHAPE





ORIGINAL  
FUS. FRAME 18  
STA 166-5

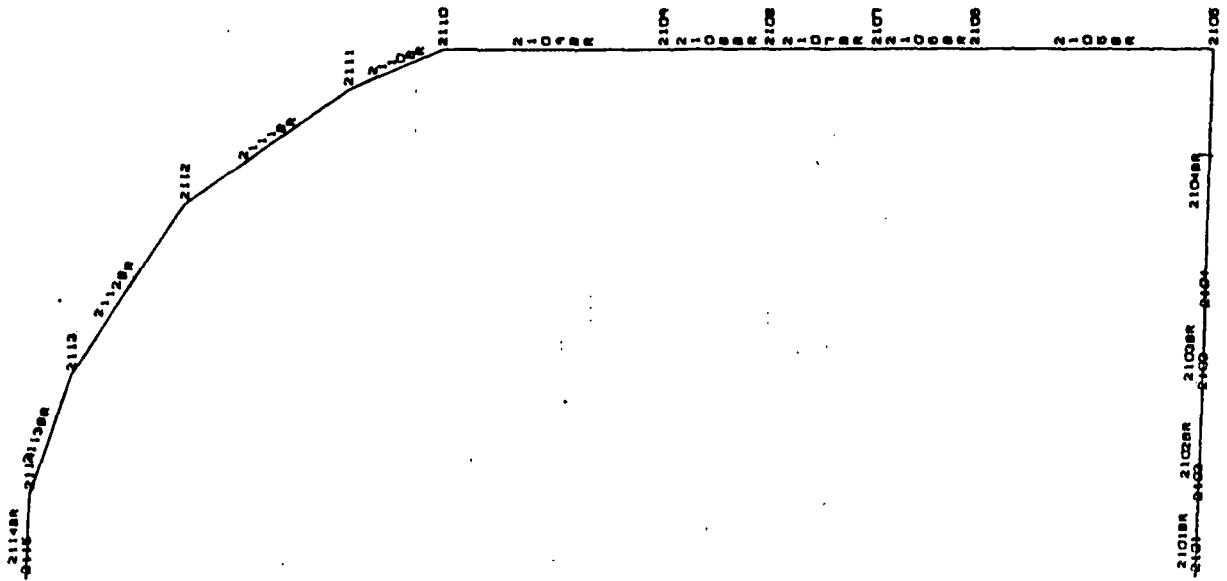
PHASE 1  
ORBITER SYMM CASE  
UNDEFORMED SHAPE



**B4-22**

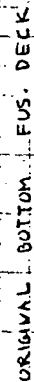






ORIGINAL  
FVS. END FRAME 21  
CANTED

PHASE 1  
CRIBTER SYMM CASE  
UNDEFORMED SHAPE



B4-25

52-981-15

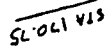
ORIGINAL FUS. BOTTOM DECK.

PHASE 1  
ORBITER SYM CASE  
UNDEFORMED SHAPE

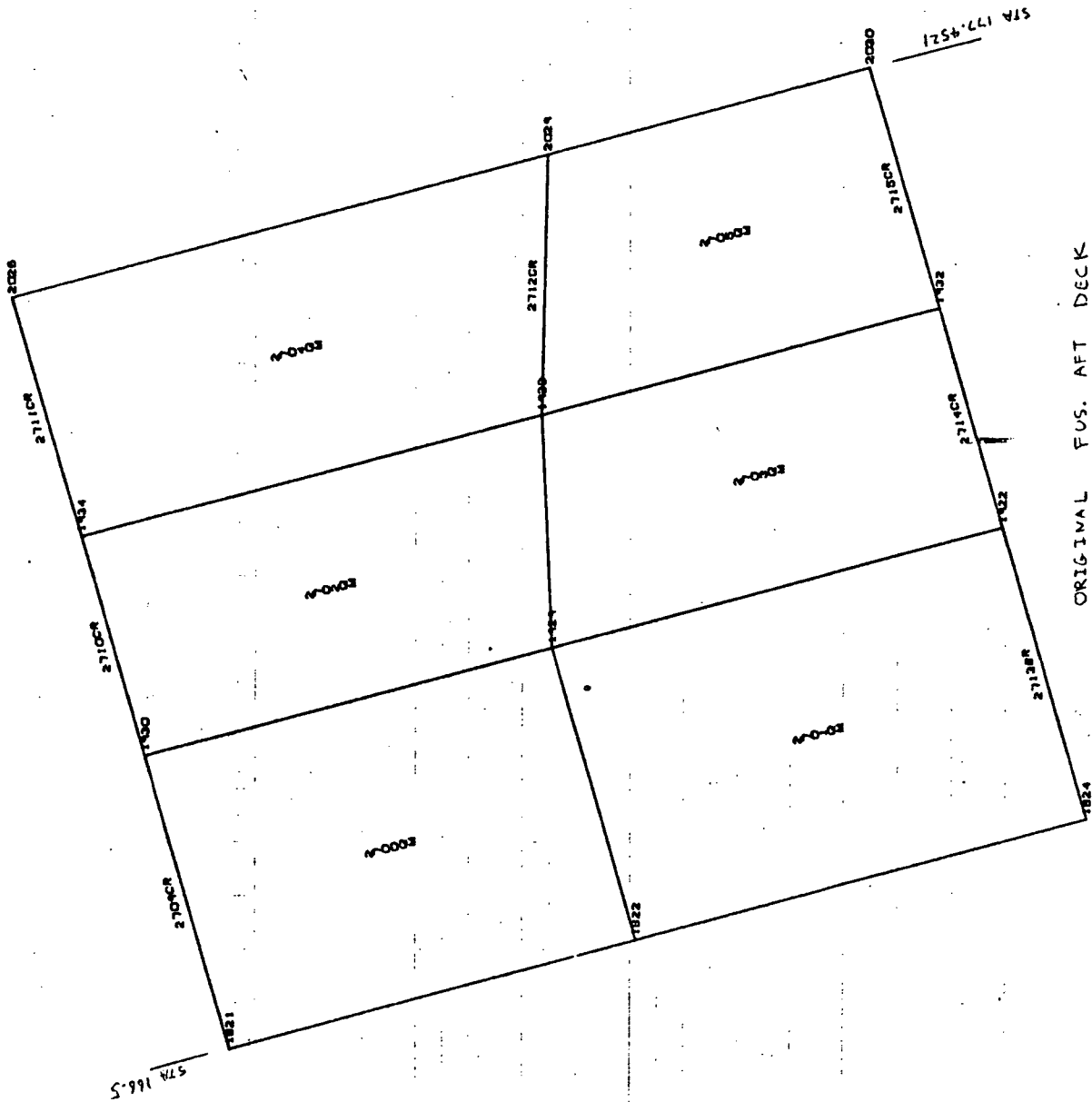


ORIGINAL FUS. FWD BALLAST DICK

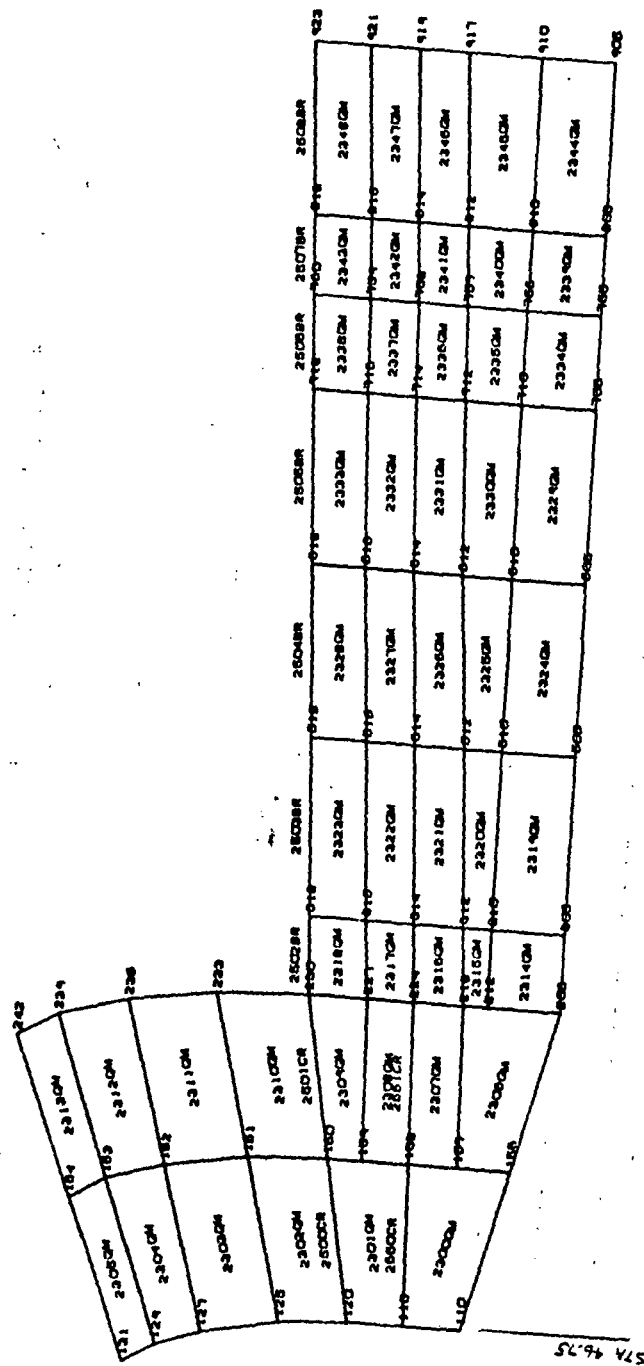
PHASE 1  
ORBITER SYMM CASE  
UNDISTORTED SHAPE



PHASE I  
ORBITER SYM CASE  
UNDEFORMED SHAPE



PHASE 1  
ORBITER SYMM CASE  
UNDEFORMED SHAPE

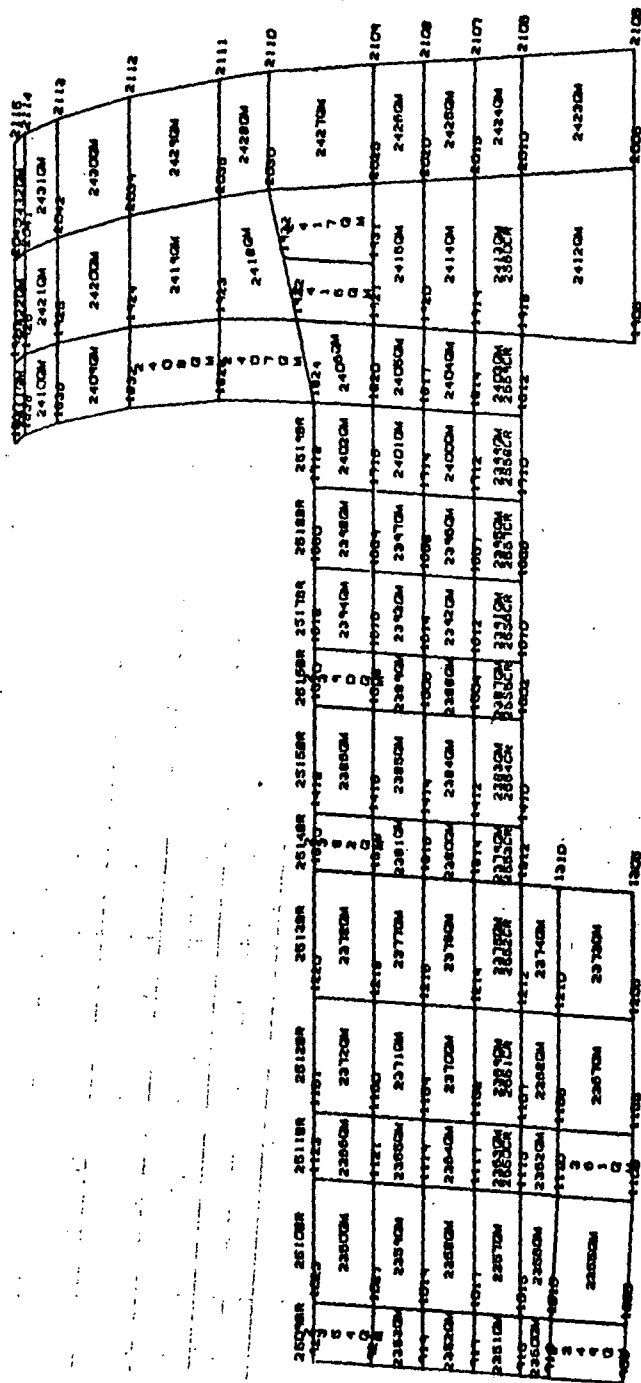


ORIGINAL FUS. OUTER SHELL

STA 116

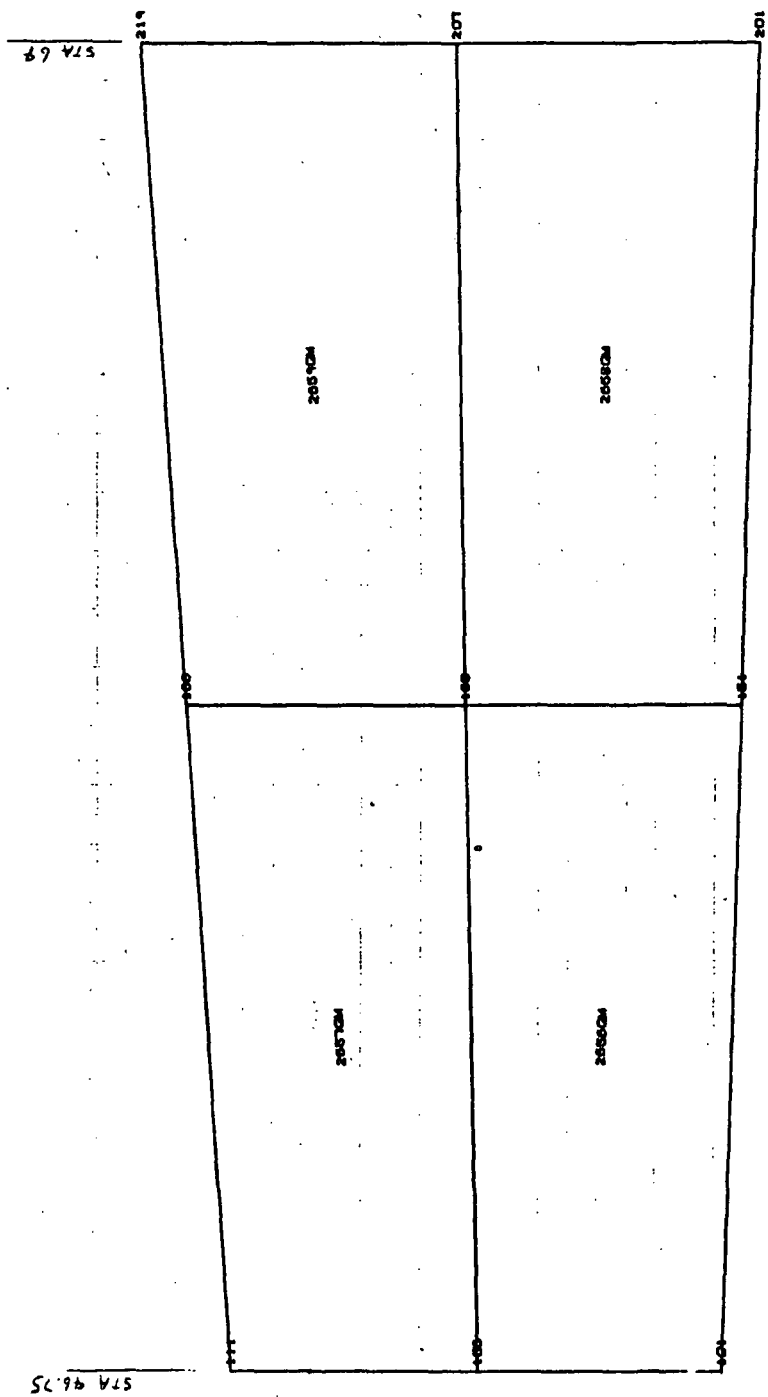
PHASE 1  
ORDER SYM CASE  
UNFORMED SHAPE





ORIGINAL FUS. OUTER SHELL

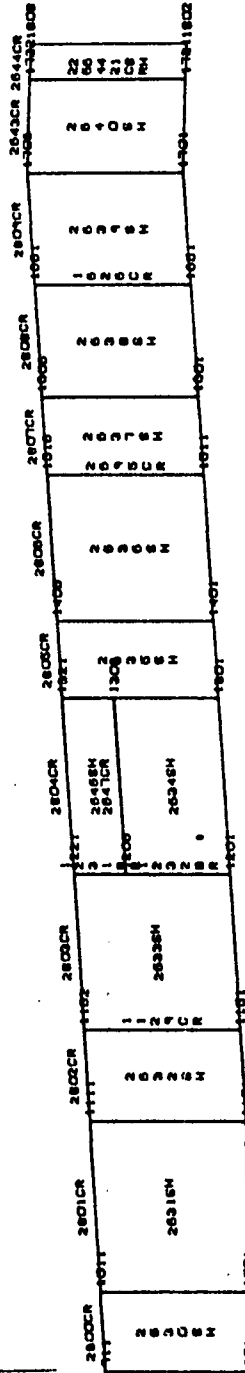
PHASE 1  
ORBITER STIM CASE  
UNDISTORTED SHAPE



PHASE 1  
ORBITER SYMM CASE  
UNDEFORMED SHAPE

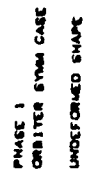
S-991 VLS

711 VLS



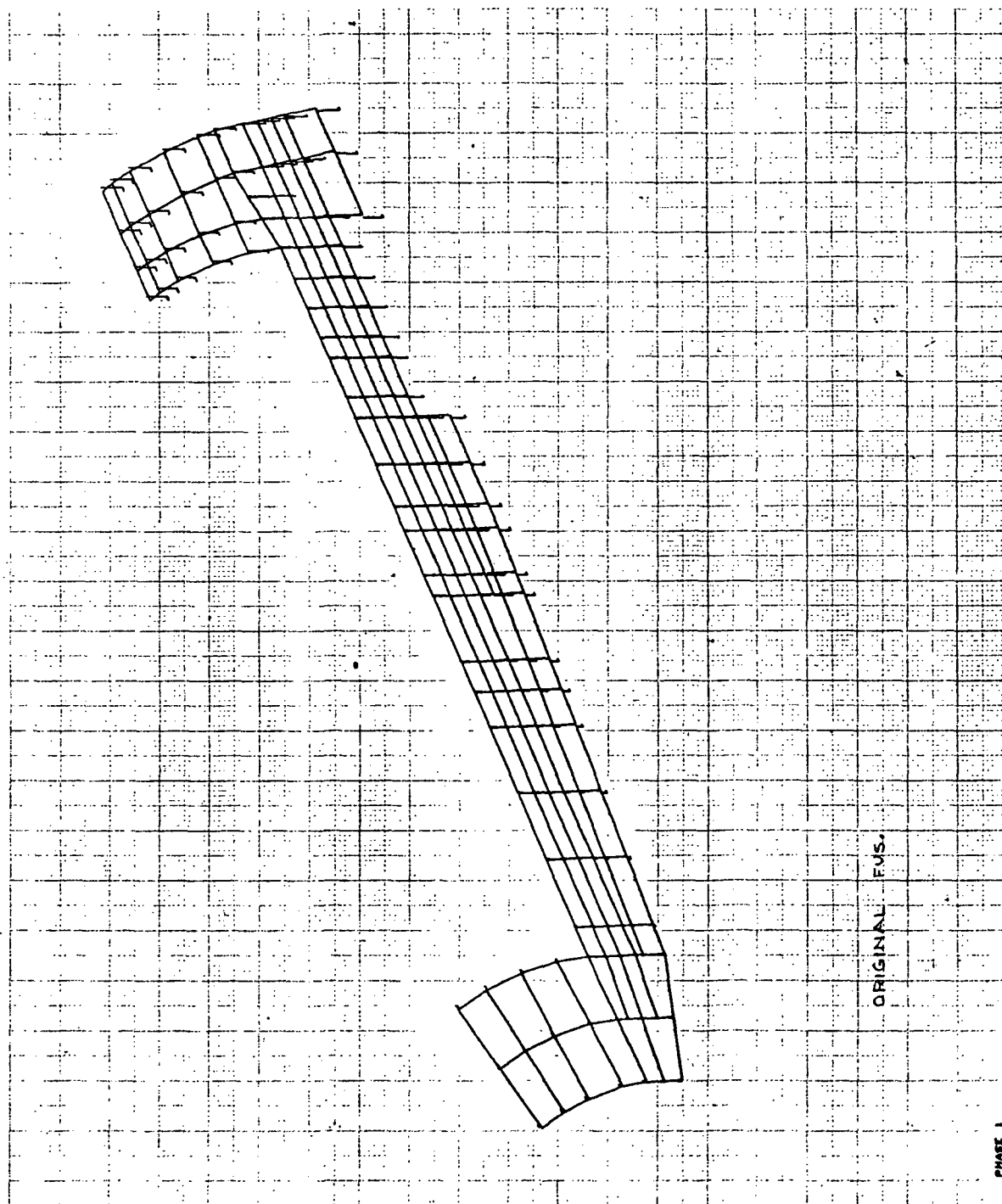
ORIGINAL FUS. AFT KEEL

PHASE 1  
ORBITER SYMM CASE  
UNDEFORMED SHAPE



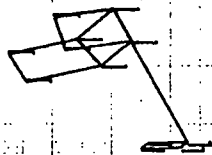
**Appendix B5**  
**PLOTS OF SYMMETRIC FREE-FREE MODES**  
**PHASE 1 ANALYSIS: MODEL 1 FUSELAGE**

14 0/28/73 MAX-DEF. = 1.00191700



PHASE 1  
ORBITER FUSELAGE STIM CASE  
RIGID BODY MODES  
MODAL DEFOR. SUBCASE 1. MODE 1 FREQ. 0.

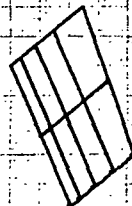
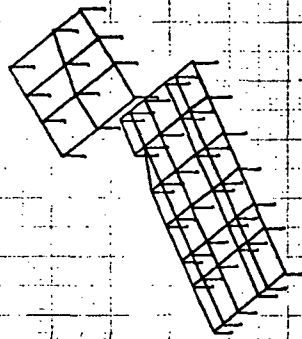
13 6/25/73 MAX-DEF. = 1.02141700



ORIGINAL FUS.

PHASE 1  
ORBITER FUSELAGE, SYMM CASE  
RIGID BODY MODES  
MODAL DEFOR. SURFACE 1 MODE 1 FREQ. 0.

6/28/73 MAX-DET. = 1.03141700

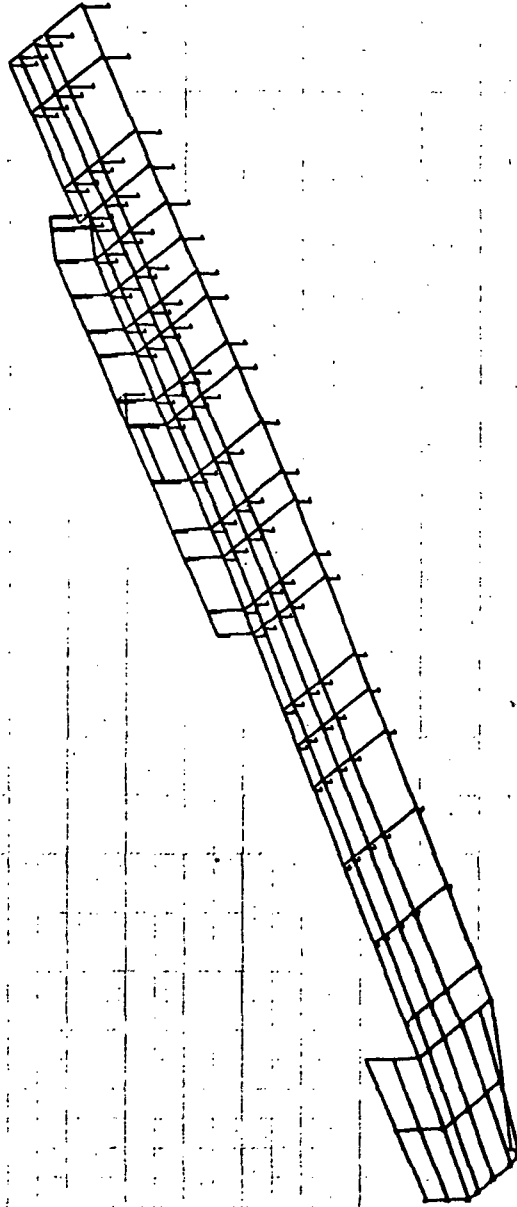


ORIGINAL FUS.

PHASE 1  
ORBITER FUEL ACQ. SYM CASE  
RIGID BODY MODEL  
MODAL DETOR. SUBCASE 1 MODC 1 FREQ. 0.



8/28/73 MAX-DET. • 1,031,91700

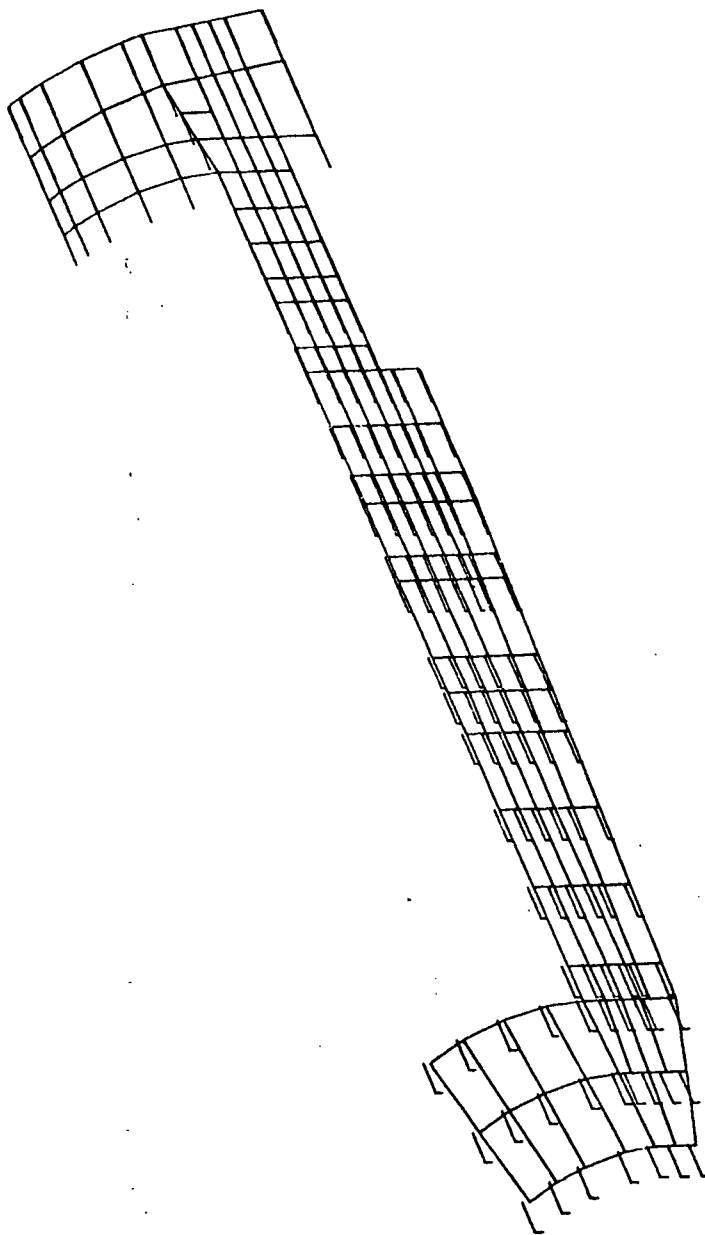


ORIGINAL FUS.

PHASE 1  
ORBITER FUELAGE STAGE CASE  
RIGID BODY MODES  
MEDAL COVER. SUBCASE 1 WING 1 PHASE 2.

6/28/73 MAX-DEF. = 0.99408849

20



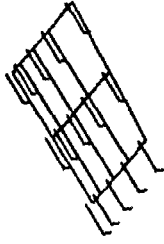
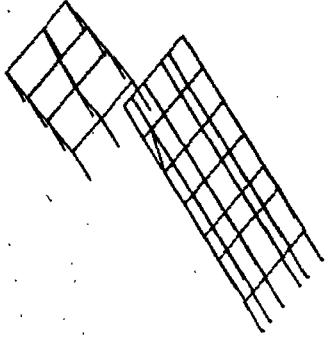
ORIGINAL FIG.

PHASE 1  
ORBITER FUSELAGE, SYMM CASE  
RIGID BODY MODES  
MODAL DEFOR. SUBCASE 2 MODE 2 FREQ. 0.

MAX-DEF. = 0.41666668

6/20/73

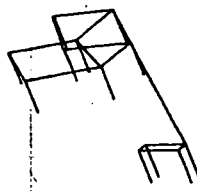
5



ORIGINAL FUS.

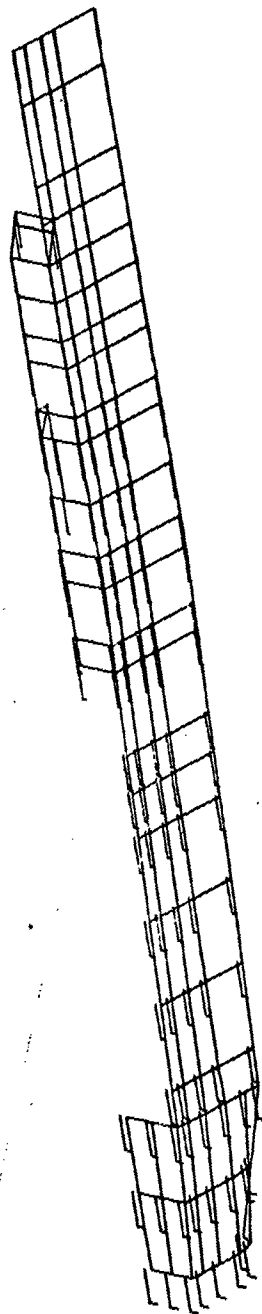
PHASE 1  
CHASSIS FUSELAGE SYMM CASE  
CHASSIS BODY MODES  
RIGID BODY DEFORM. SUBCASE 2  
MODAL DEFORM. SUBCASE 2  
MODE 2 FREQ. 0.

14 6/28/73 MAX-DEF. = 0.946848



ORIGINAL FUS.

PHASE 1  
ORBITER FUSELAGE, SYMM CASE  
RIGID BODY MODES  
MEDIAL DEFOR. SUBCASE 2 MODE 2 FREQ. 0.

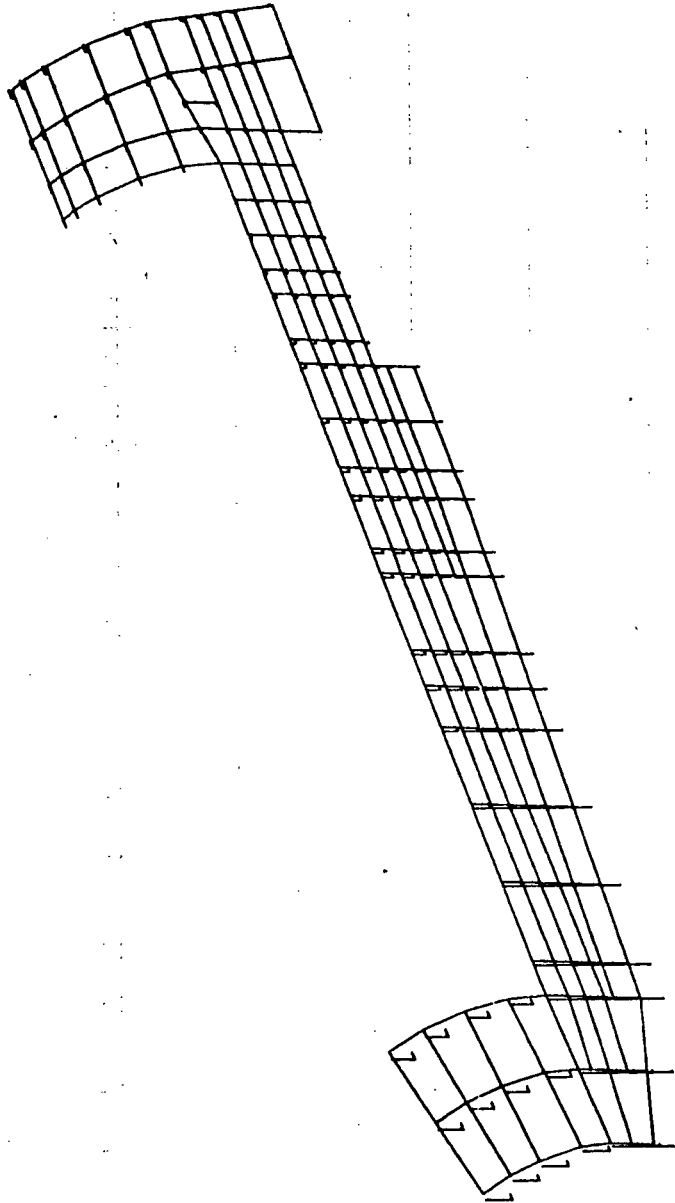


ORIGINAL FUS.

PHASE 1  
ORBITER FUELTAGE, STIM CASE  
RIGID BODY MODES  
MODAL DETERM. SUBCASE 2 MODE 2 FREQ. 0.

8/26/73 MAX-DET. P. D. 1408848

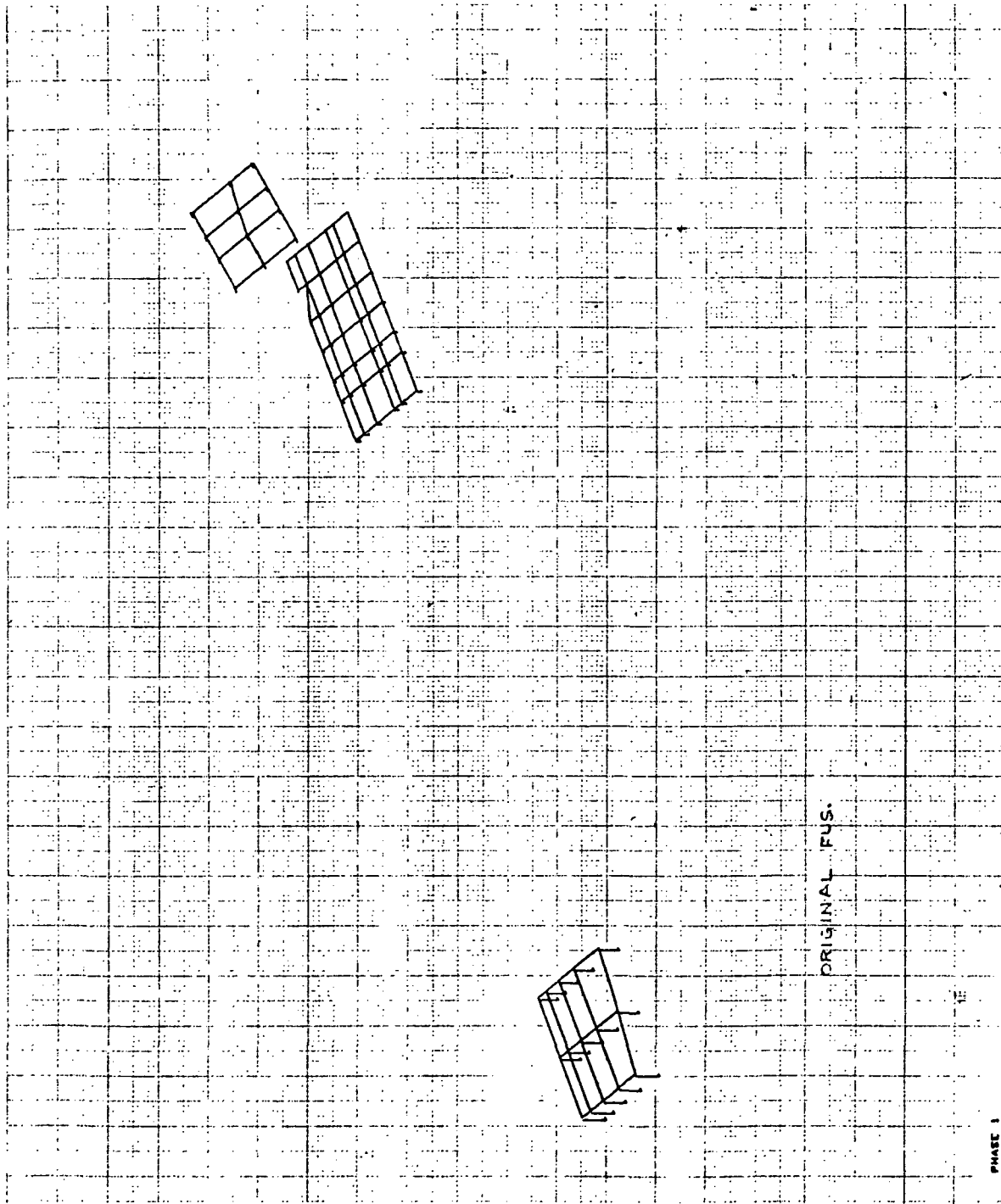
21 9/28/73 MAX-DEF. = 1.00000000



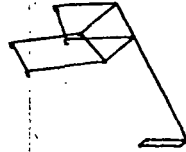
ORIGINAL FILE.

PHASE 1  
ORBITER FUSELAGE, SYMM CASE  
RIGID BODY MODES  
MODAL DEFOR. SUBCASE 3 MODE 3 FREQ. 0.

6/28/73 MAX-DEF. = 1.00000000



PHASE 1  
ORBITER FUELAGE, SYMM CASE  
RIGID BODY MODES  
MODAL DEFOR. SUBCASE 3 MODE 3 FREQ. 0.



15 8/28/73 MAX-DEF. = 1.00000000

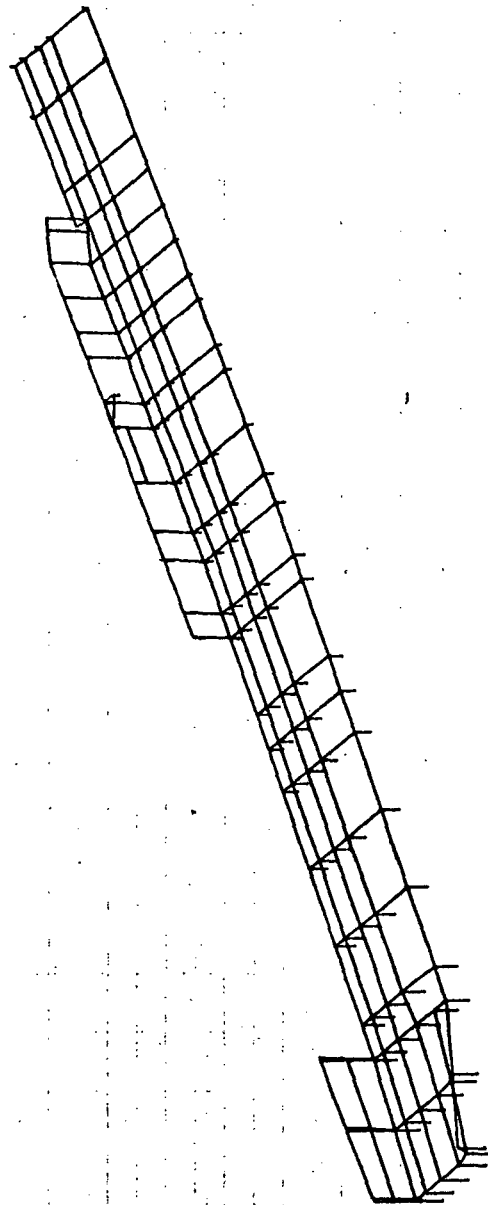
15

ORIGINAL FDS.

PHASE 1  
ORBITER FUSELAGE, SYMM CASE  
RIGID BODY MODES  
MODAL DEFOR. SUBCASE 3 MODE 3 FREQ. 0.



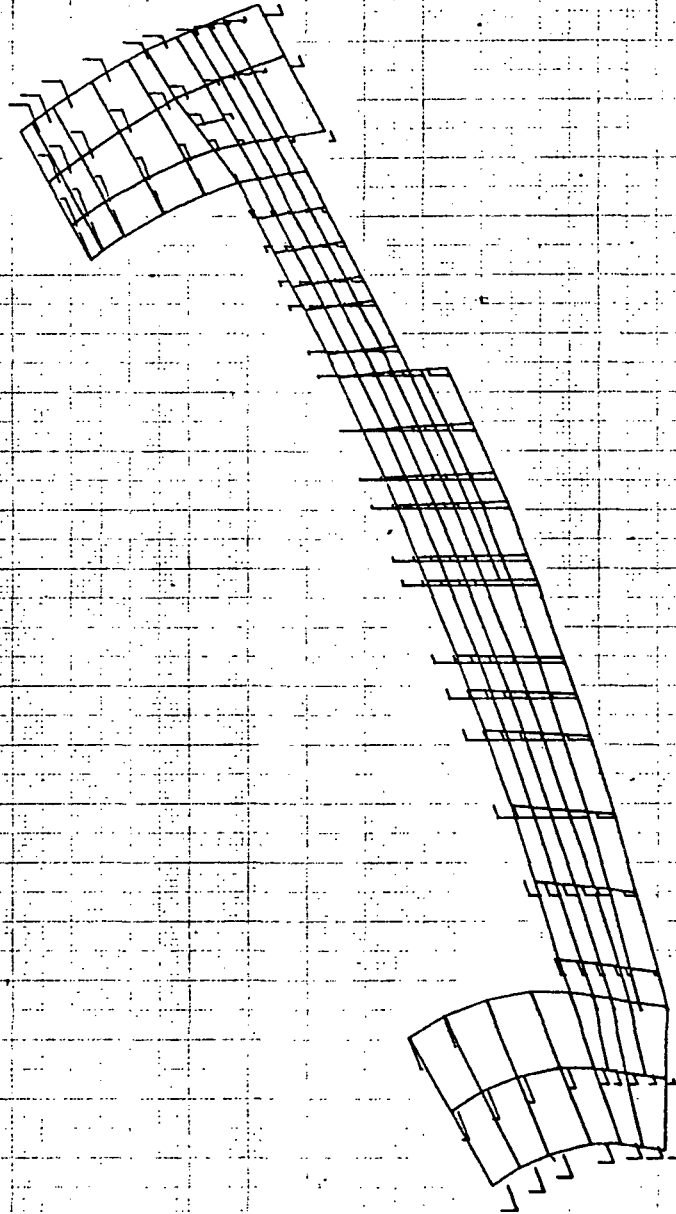
3 6/26/73 MAX-DEF. = 1.00000000



ORIGINAL FUS.

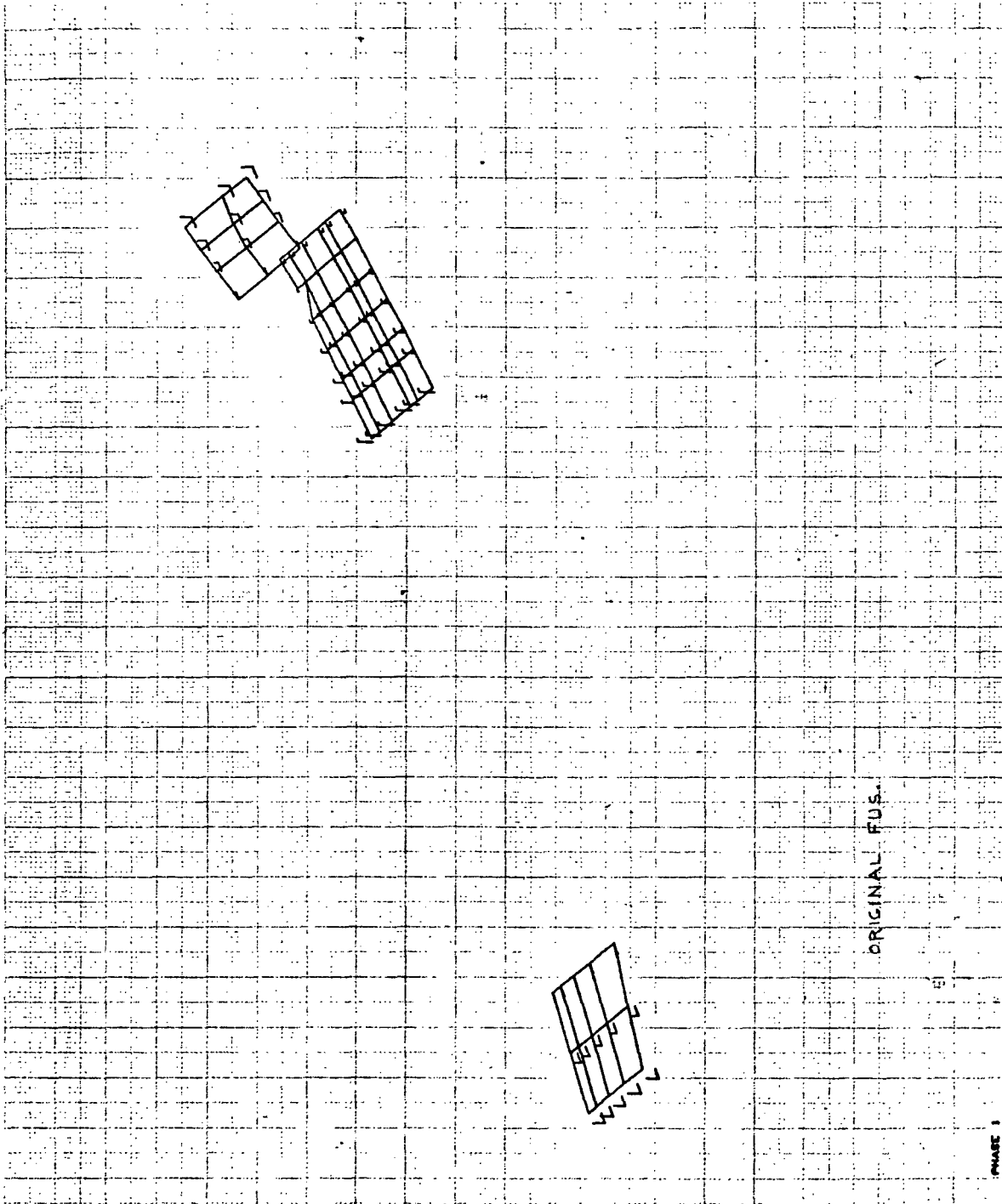
PHASE 1  
ORBITER FUSELAGE, SYMM CASE  
RIGID BODY MODES  
MODAL DEFOR. SUBCASE 3 MODE 3 FREQ. 0.

3/1 5/2



ORIGINAL F.U.S.

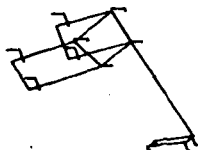
PAGE 1  
ORBITER FUSELAGE, SYMM CASE  
FREE FREE MODES  
MODAL DETON, SUBCASE-4 MODE 4 FREQ. 82.18459



PHASE 1  
ORBITER FUELAGE. SYMM CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 4 MODX 4 FREQ. 92.18459

8/28/73 MAX-DEF. = 1.00000000

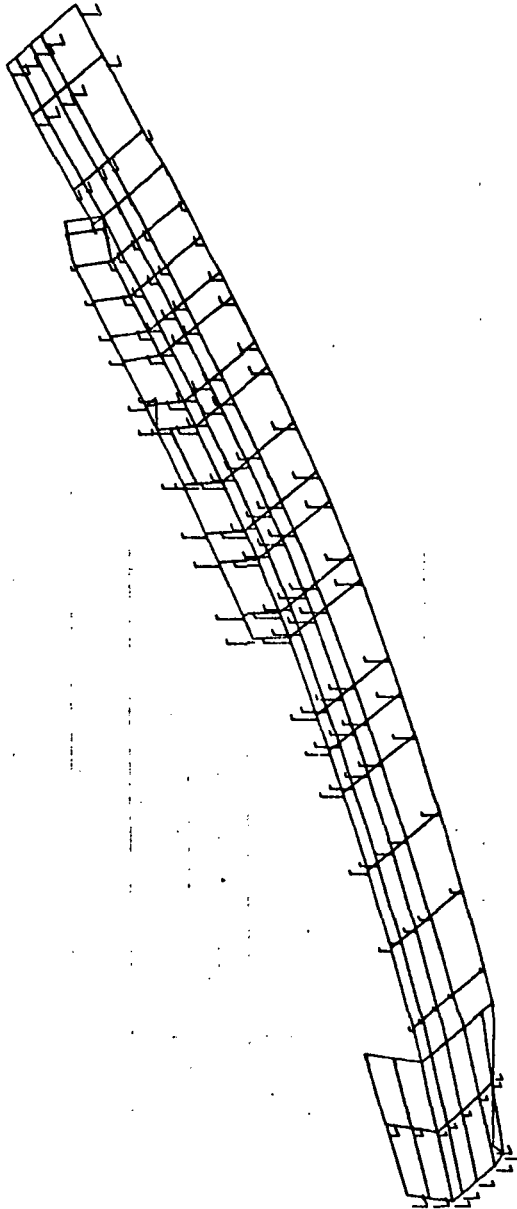
18



ORIGINAL FILE

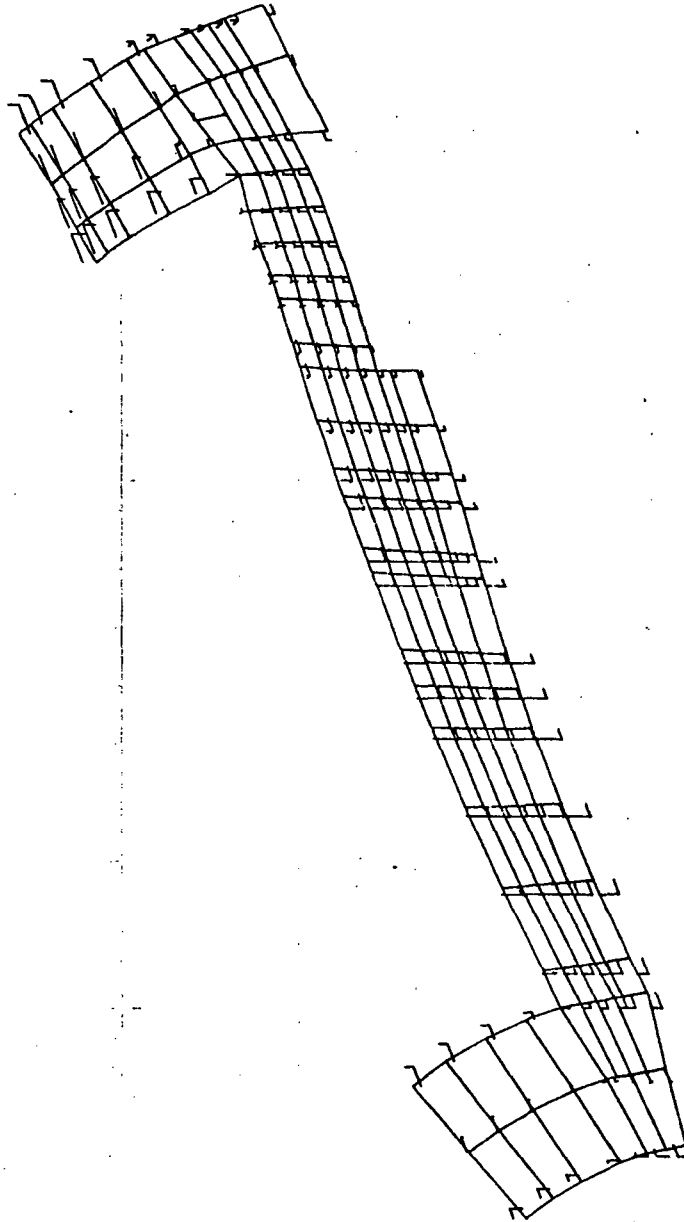
PHASE 1  
ORBITER FUSELAGE, SYMM CASE  
FREE FREE MODES  
MODAL DETON. SUBCASE 4 MODE 4 FREQ. 62.18459

4 6/28/73 MAX-DEF. = 1.0000000



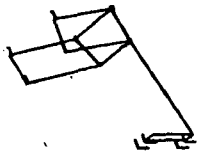
ORIGINAL FUS.

PHASE 1  
ORBITER FUSELAGE SYMM CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 4 MODE 4 FREQ. 92.18459



ORIGINAL FUS.

PHASE 1  
ORBITER FUSELAGE, SYMM CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 4 MODE 5 FREQ. 124.4091



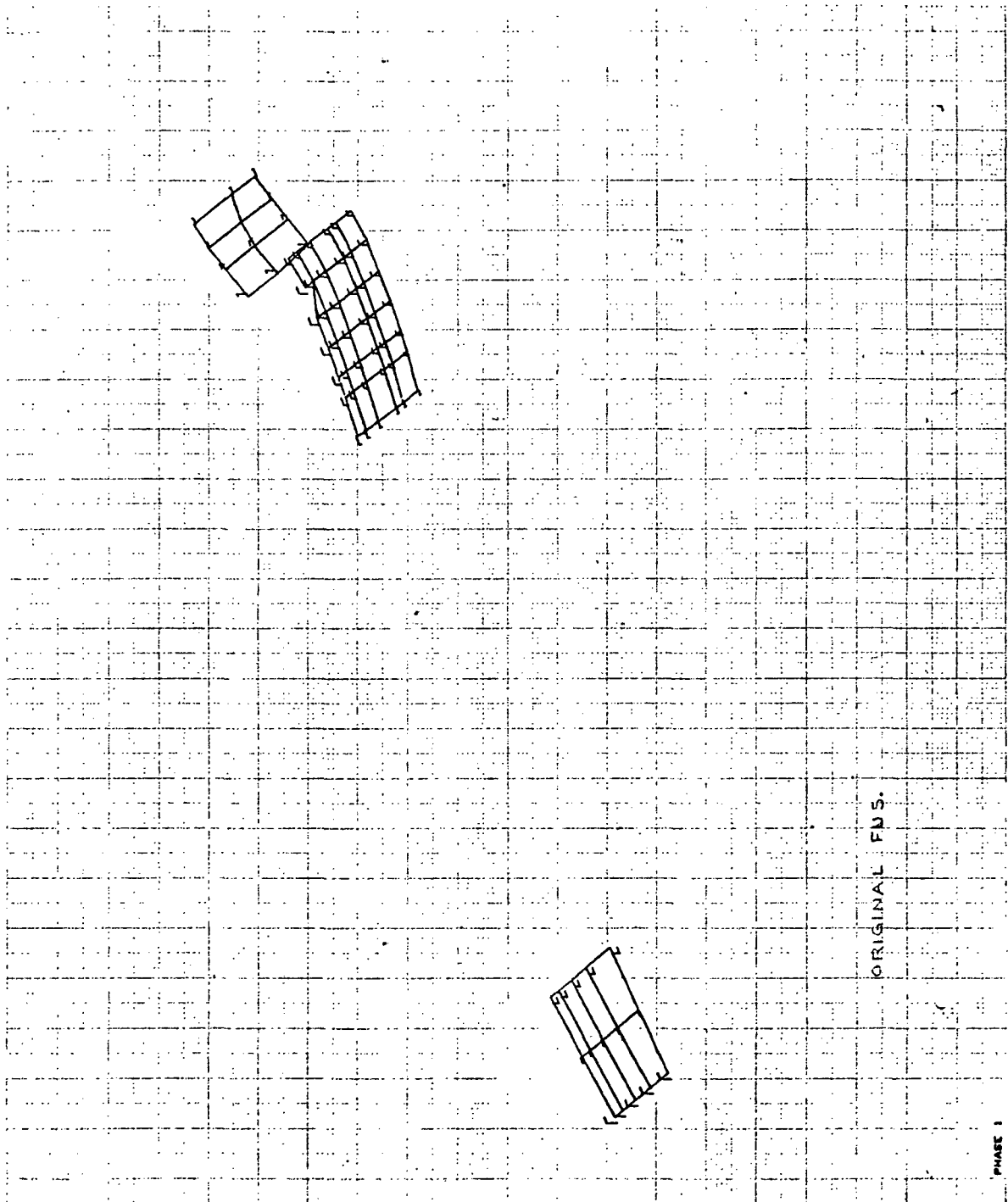
ORIGINAL FUS.

PHASE 1  
ORBITER FUSELAGE, SYMM CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 4 MODE 5 FREQ. 129.4091

11

6/28/73 MAX-DEF. = 1.00000000

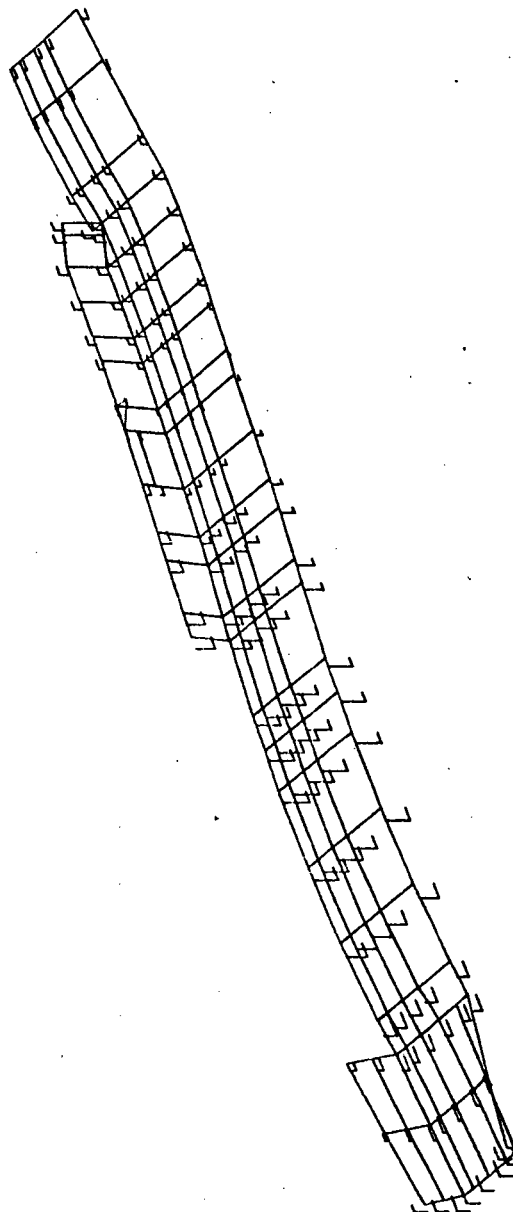
11



PHASE 1  
ORBITER FUELADE, STIM CASE  
FREE FREE MODES  
MODAL DEFOR. SURCASE 4 MODE 5 FREQ. 124.4041

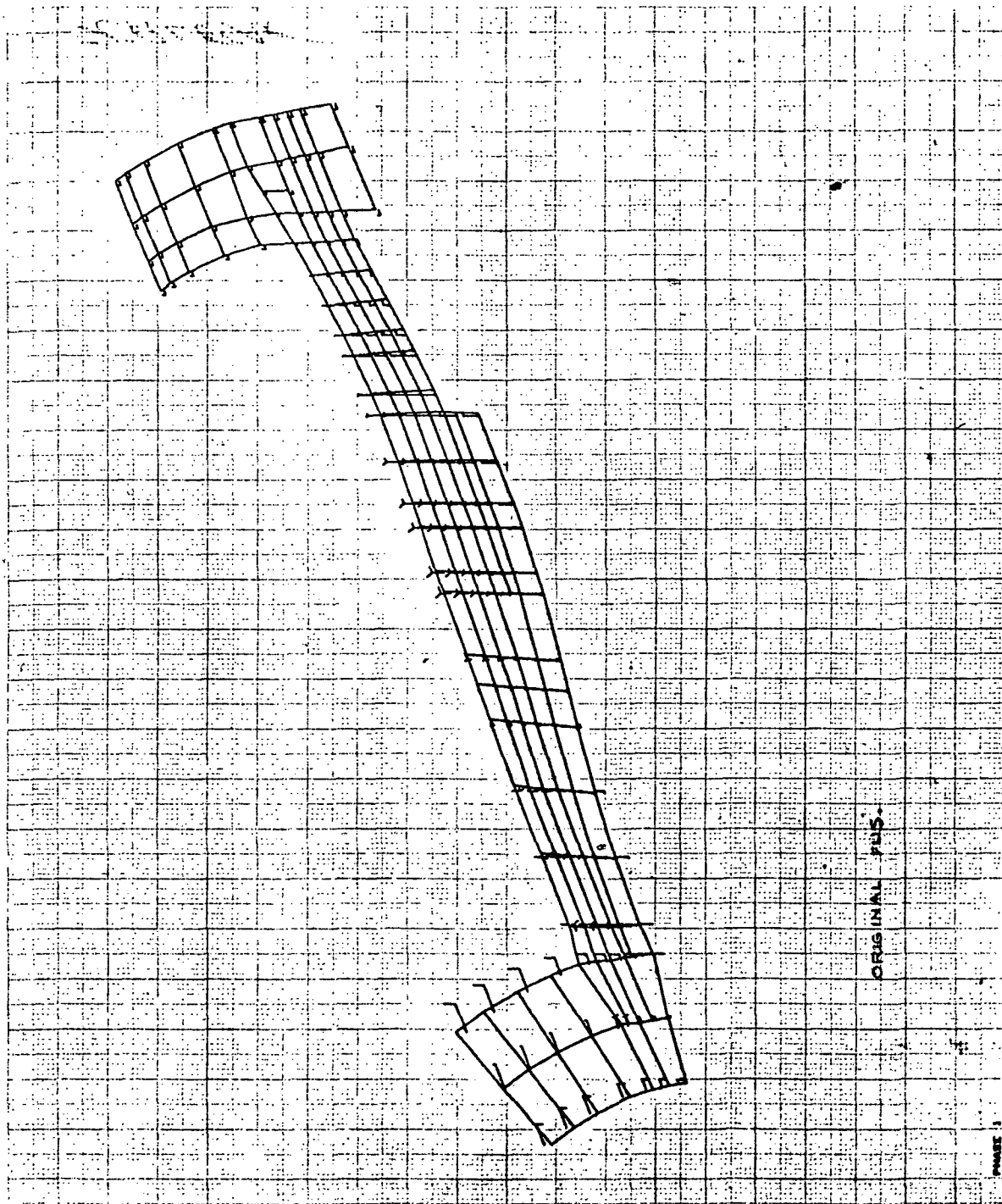


5 0/28/73 MAX-DEF. = 1.00000000

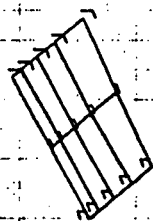
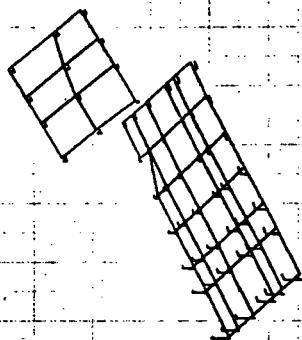


ORIGINAL FUS.

PHASE 1  
ORBITER FUSELAGE, SYMM CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 4 MODE 8 FREQ. 129.4041



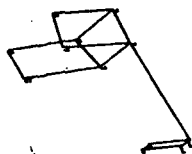
PHASE 1  
 ORBITER FUELRAGE, STW CASE  
 PRICE FREE MEMES  
 MEDAL DEFON. SUBCASE 4 MEDE 8 PRED. 141.3404



ORIGINAL FUS.

PHASE 1  
ORBITER FUSELAGE, STYMI CASE  
FREE FREE MOSES  
MODAL DETON. SURCASE 4 MODE 6 FREQ. 191.9404

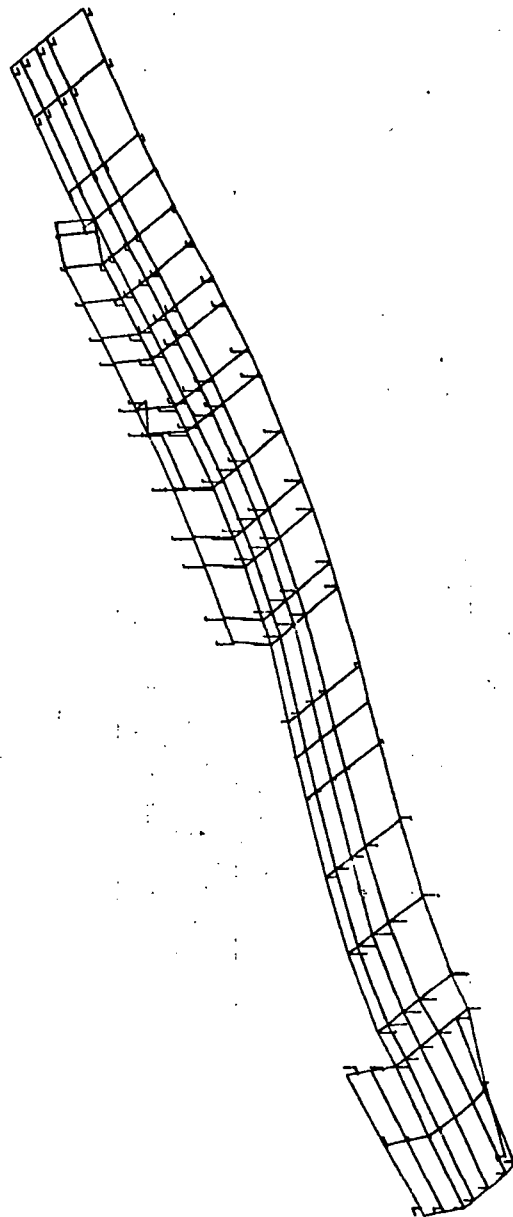
6/26/73 MAX-DEF. = 1.24793430



ORIGINAL FUS.

PHASE 1  
ORBITER FUSELAGE, SYMM CASE  
FREE FREE MODES  
MODAL DETOR. SUBCASE 4 MODE 6 FREQ. 191.3404

6 8/28/73 MAX-DEF. = 1.24793430

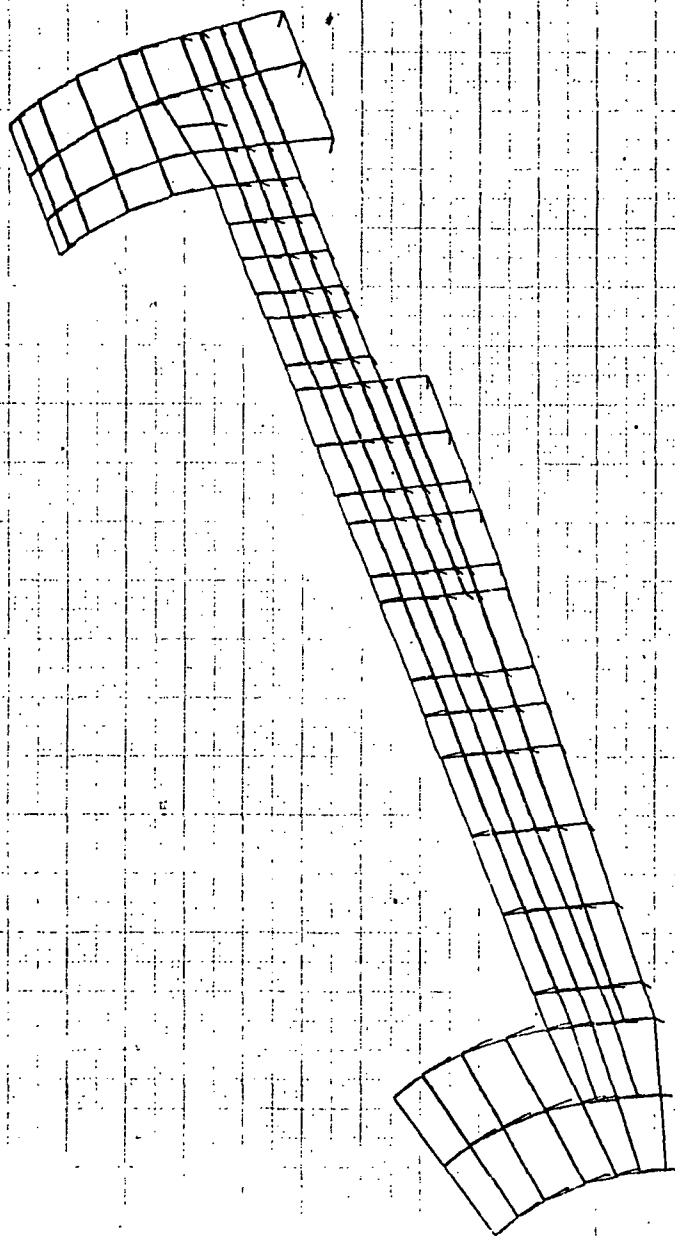


ORIGINAL FUS.

PHASE 1  
ORBITER FUSELAGE, SYMM CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 4 MODE 0 FREQ. 191.3404

**Appendix B6**  
**PLOTS OF ANTISYMMETRIC FREE-FREE MODES**  
**PHASE 1 ANALYSIS: MODEL I FUSELAGE**

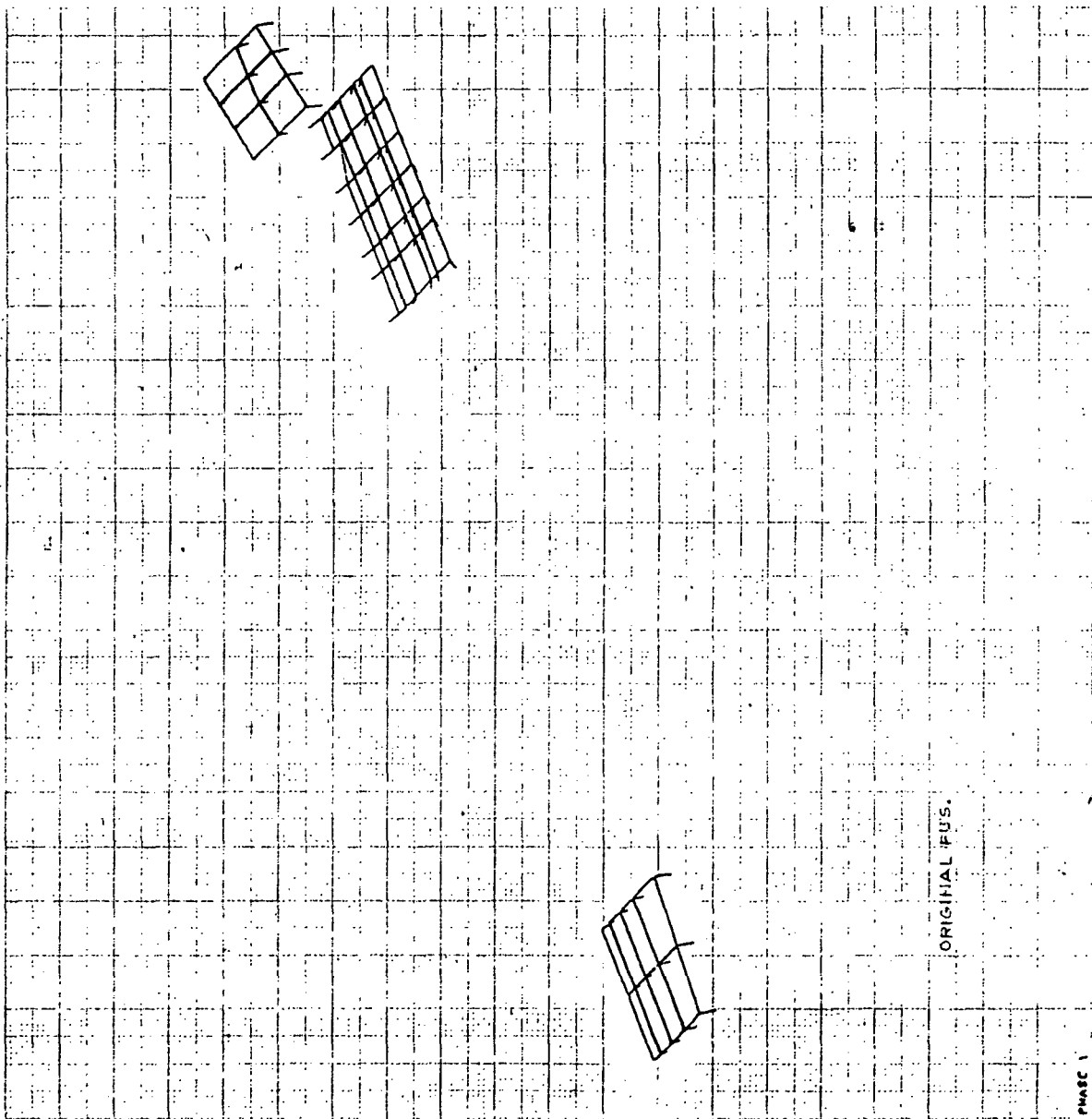
6/23/73 MAX-DEF. = 1.11006160



ORIGINAL FUS.

PHASE 1  
ORBITER FUSELAGE, ANTI CASE  
RIGID BODY MODES  
MODAL DEFOR. SUBCASE 1 MODE 1 FREQ. 0.

8/21/73 MAX-DEF. = 1.11008160

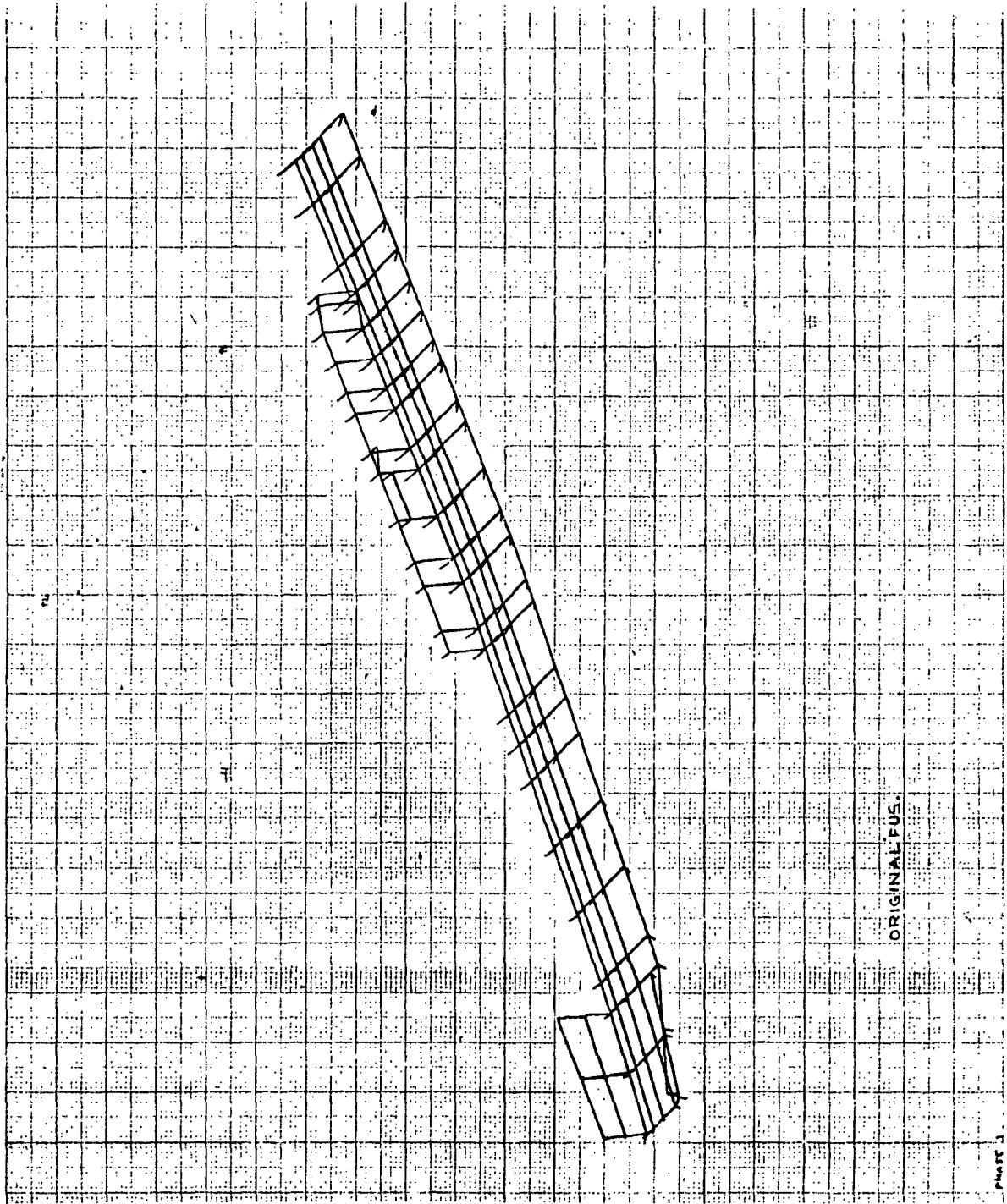


ORIGINAL FUS.

PHASE 1  
ORBITER FUSelage-ANTI CASE  
RIGID BODY MODES  
MODAL DEFOR. SUBCASE 1 MODE 1 FREQ. 0.



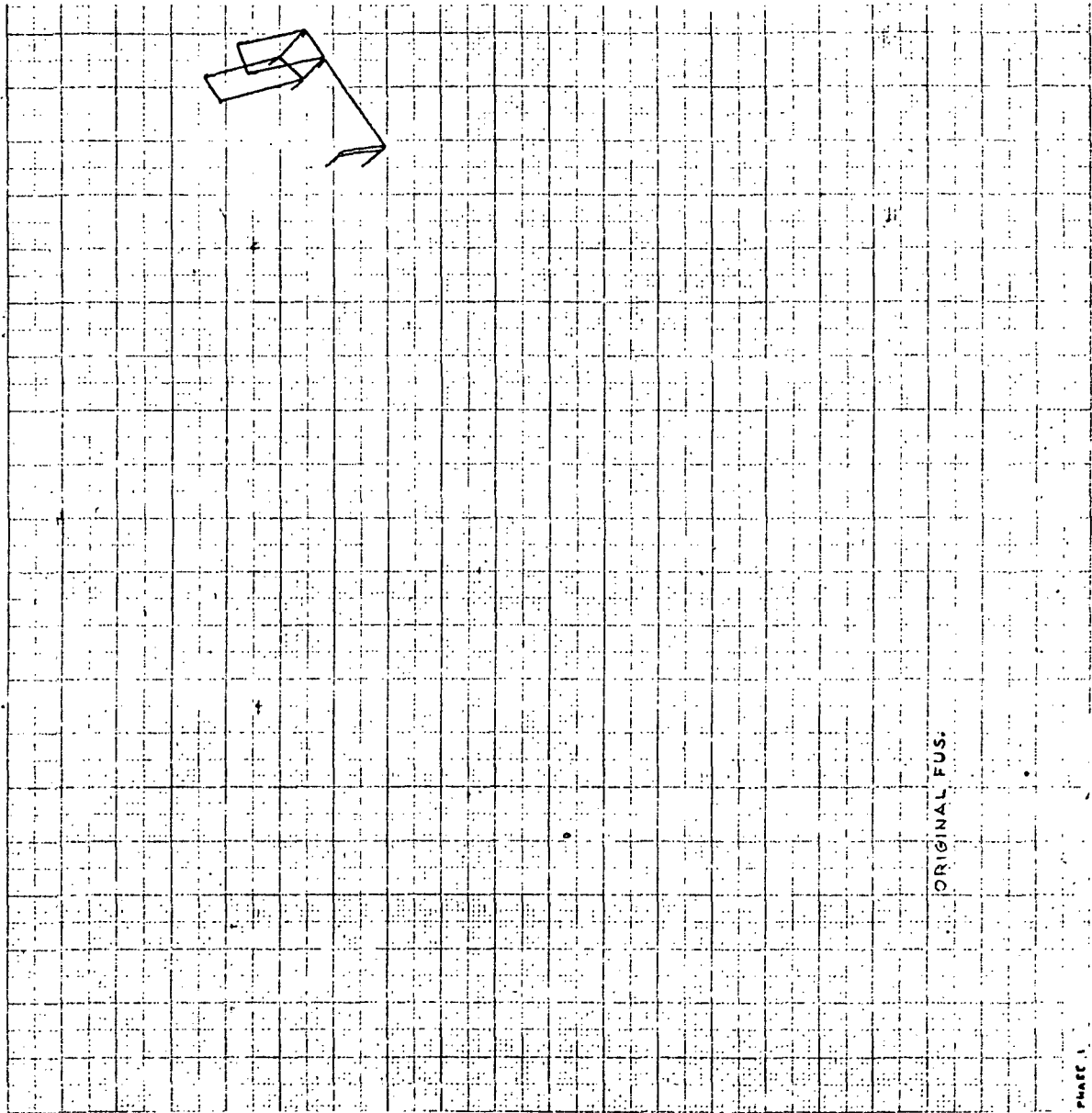
8/31/73 MAX-DEF. = 1.11005160



ORIGINAL FUS.

PHASE 1  
ORIGINAL FUSELAGE, ANTI CASE  
RADIO BODY MODES  
MODAL DEFOM. SUBCASE 1 MODC.1 FREQ. 0.

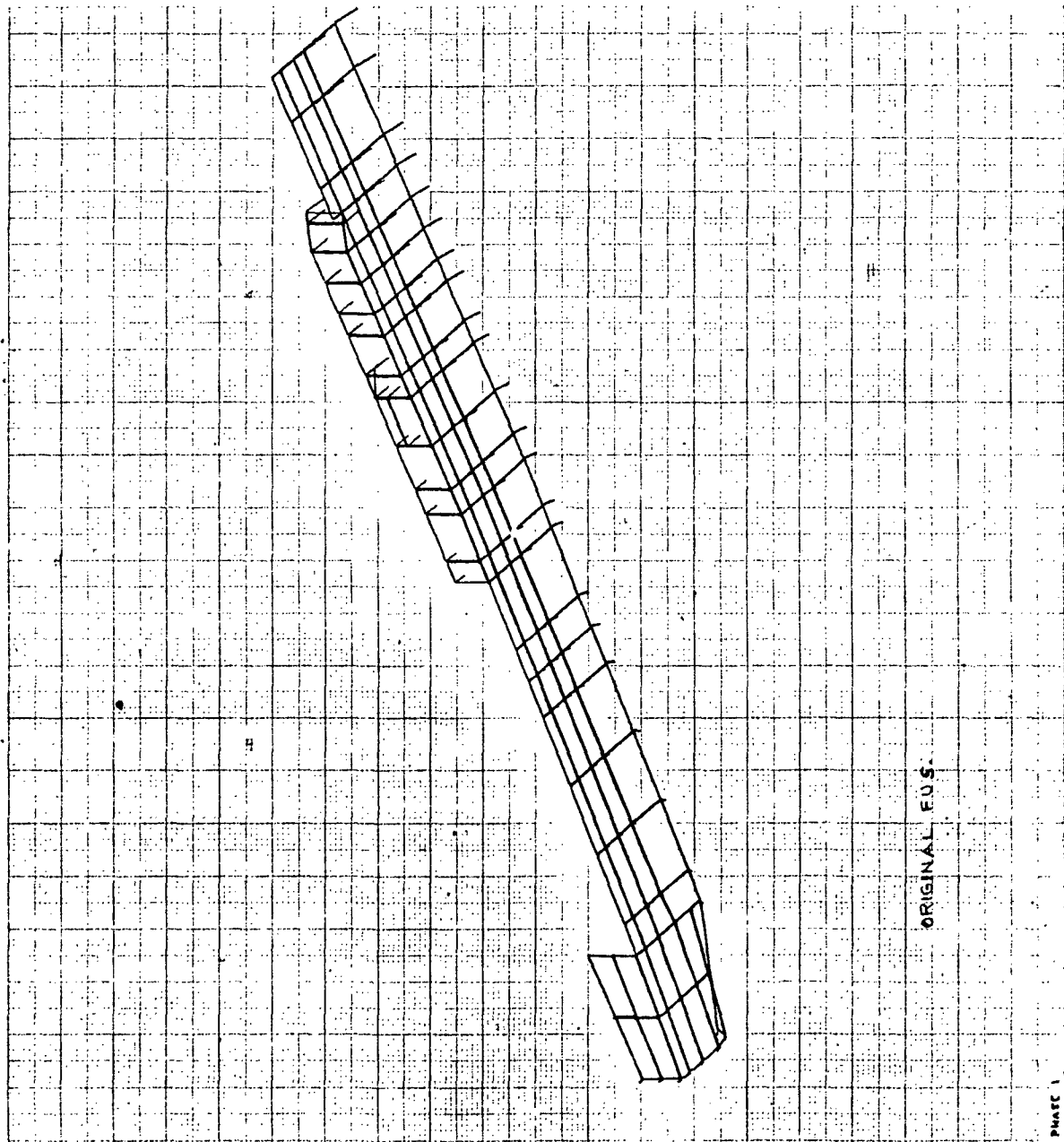
53 6/21/73 MAY-DEC. 8 1.11006160



ORIGINAL FUS.

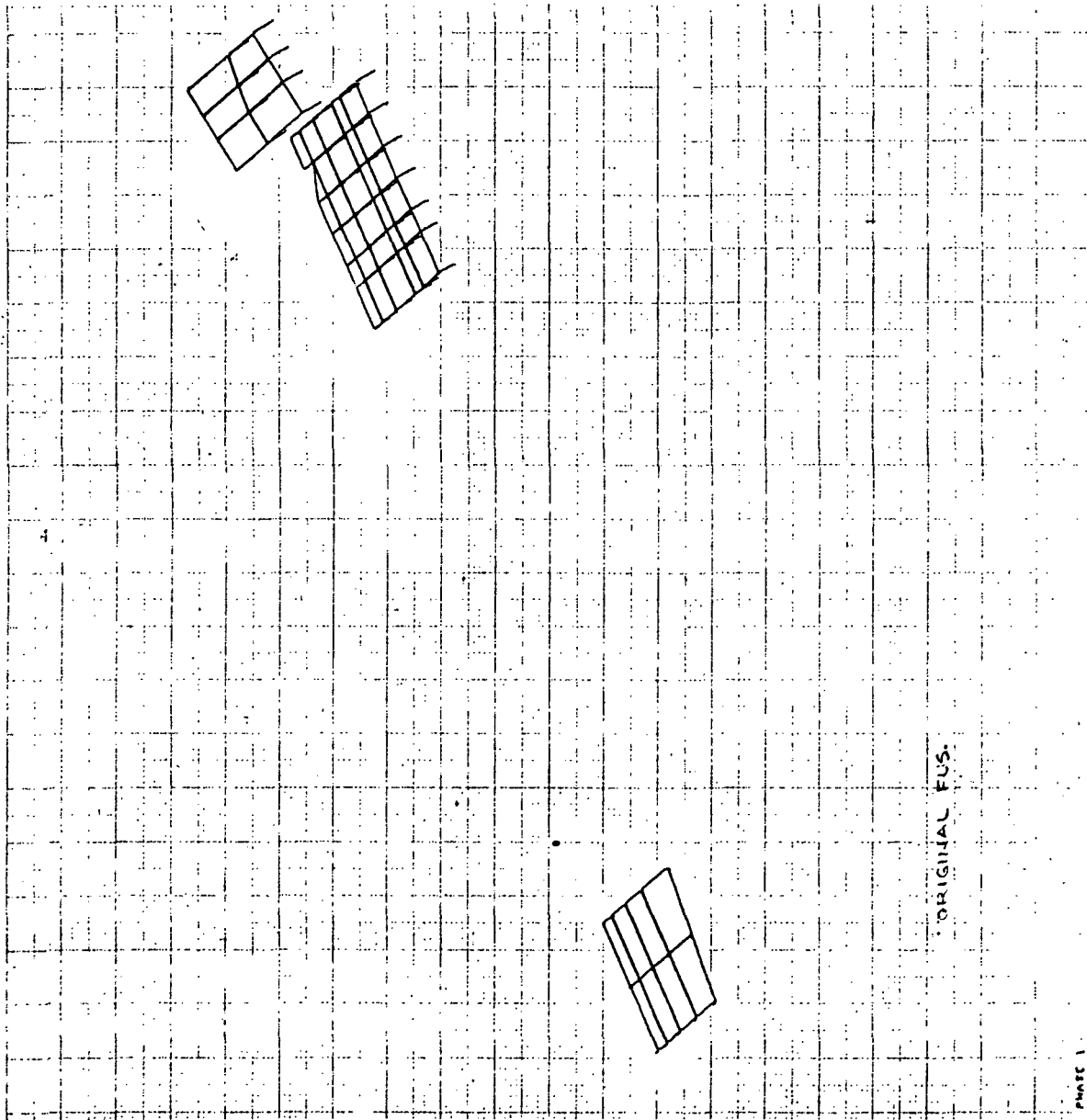
PHASE 1  
ONE-STEP FUSELAGE/ANTI CASE  
RIGID BODY MODES  
MODAL DEFOM. SUBCASE 1 MODC 1 FREQ. 0.

2 6/21/75 MEX-DEF. = 1.015150



PHASE 1  
ORALICE FUSelage, AMT CASE  
ALGO BODY MODEL  
MODAL DEFON, SUBCASE 1: MOD 2 PAGE 0.

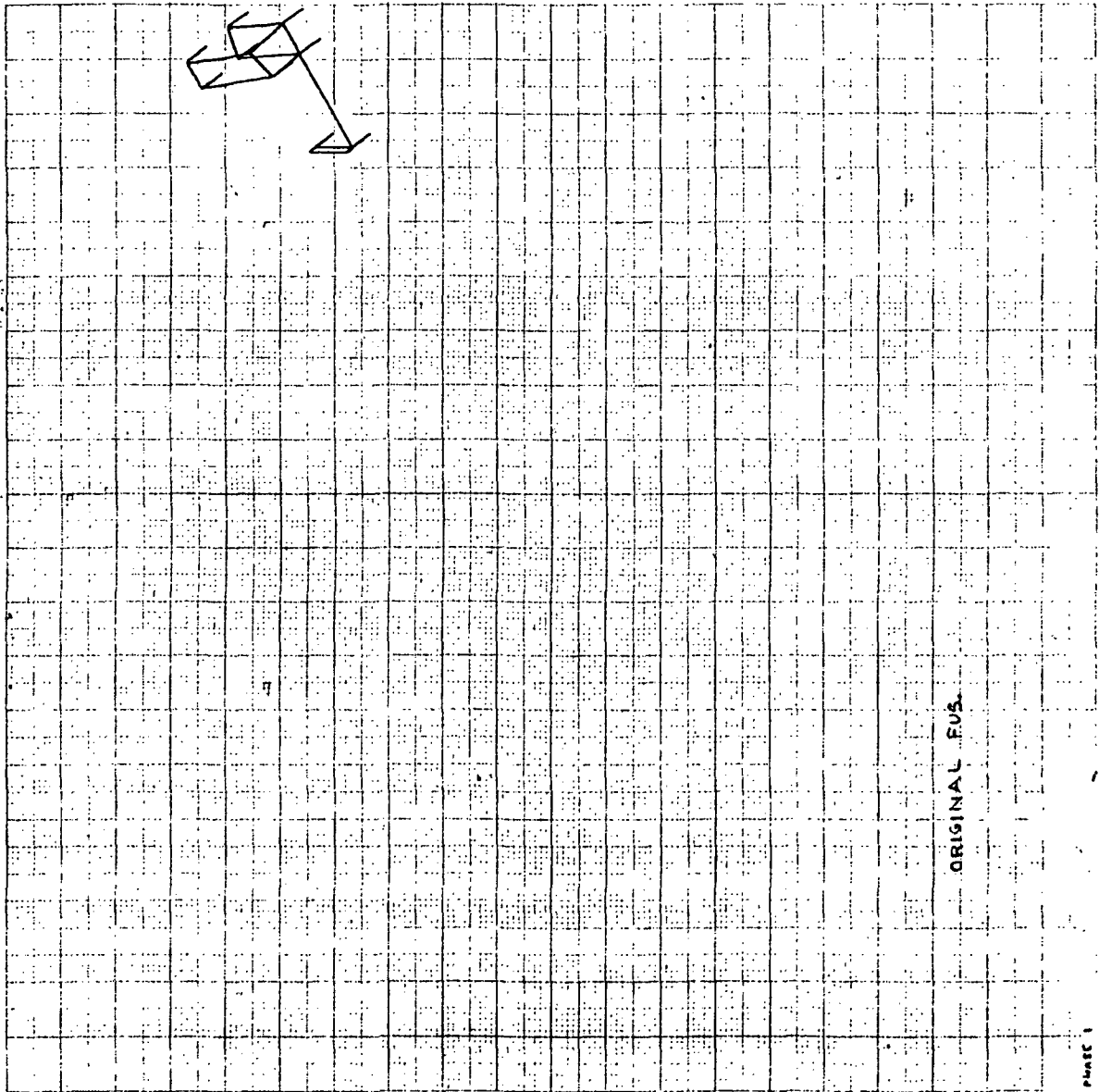
6 6/7/73 MAY-DEC. = 1.07161550



ORIGINAL FUS.

PHASE 1  
ORBITER FUSCLACC.ANTI CASE  
RIGID BODY MODES  
MODAL DECOR. SUBCASE 3 MODE 3 FREQ. D.

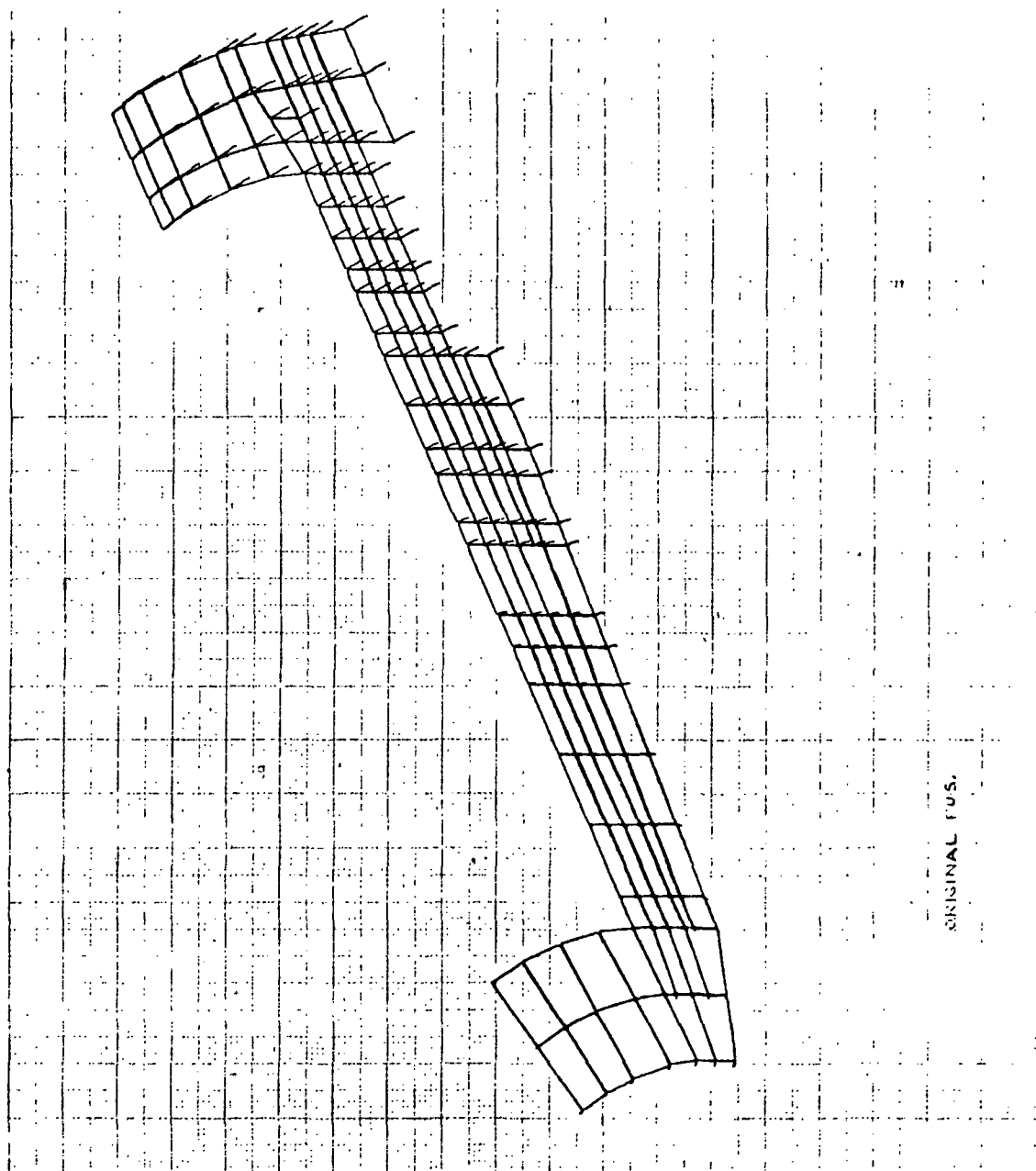
6/21/73 MAY-DEC. • 1.0015150



ORIGINAL FUS.

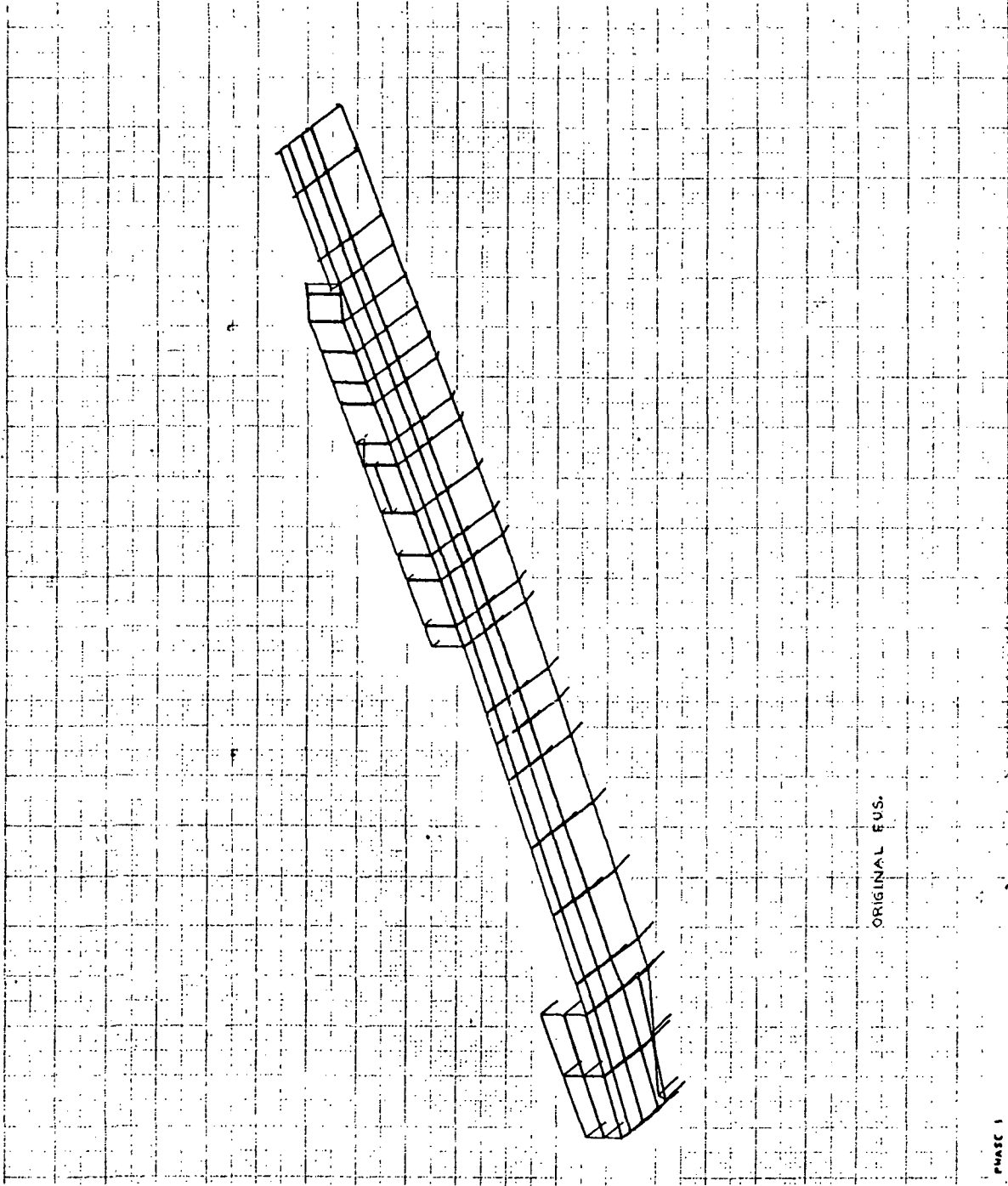
PHASE 1  
ORBITER FUSelage, AMT1 CASE  
RIGID BODY MODES  
MODAL DEFOR. SUBCASE 2 MODE 2 FREQ. 0.

20 6/11/70 MAY-DEF. = 1.00181550



PHASE 1  
UNBITER FUSELAGE, ANTI CASE  
RIGID BODY MODES  
MODAL DEFOM. SUBCASE 2 MODE 2 FREQ. 0.

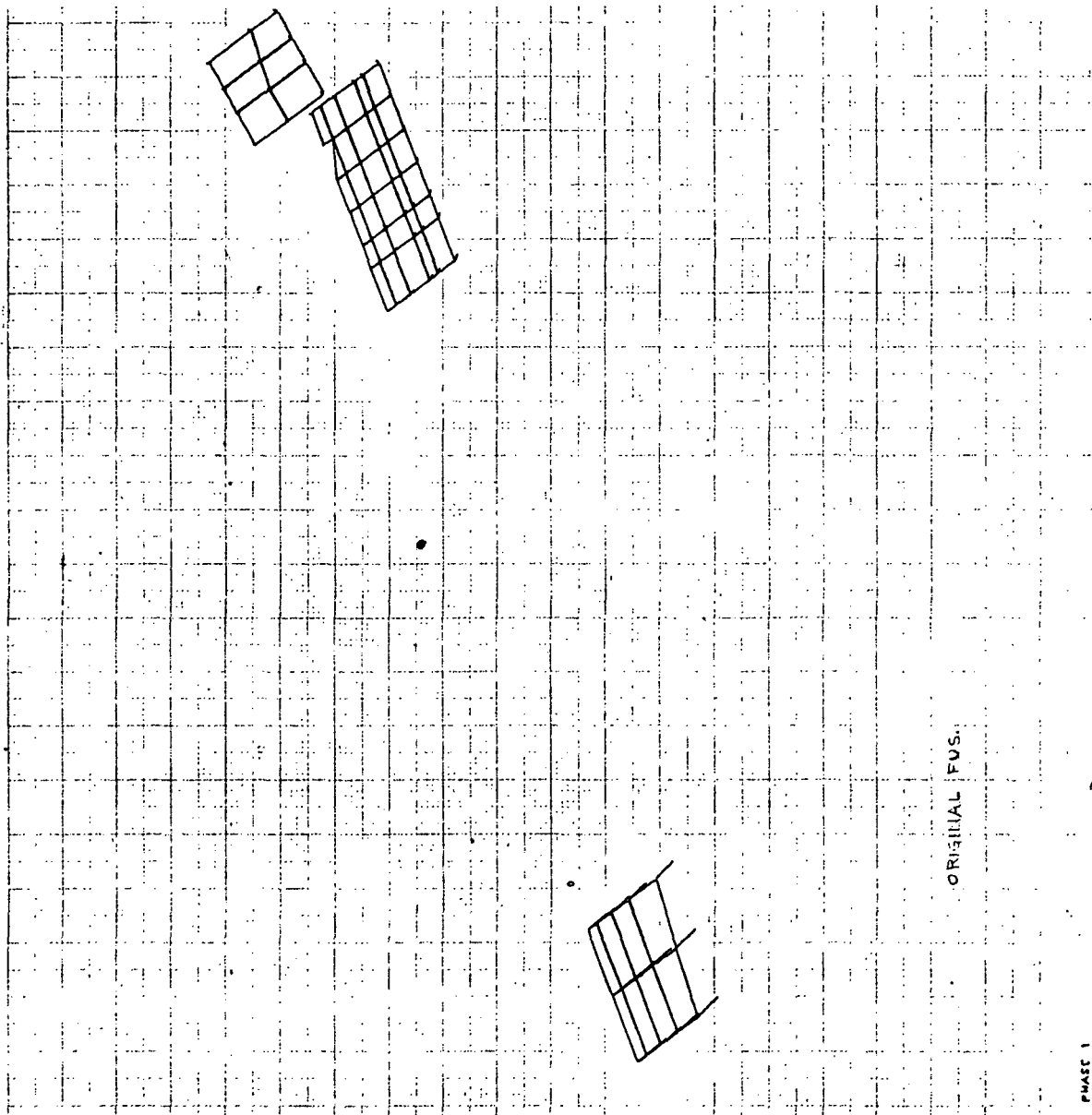
3 6/21/73 MAX-DEF. = 1.00000000



ORIGINAL EUS.

PHASE 1  
ORBITER FUSELAGE, ANTI CASE  
RIGID BODY MODES  
MODAL DEFOR. SUBCASE 3 MODE 3 FREQ. 0.

6/21/73 MAX-DEF. = 1.00000000

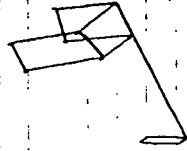


ORIGINAL FUS.

PHASE 1  
ORBITER FUSELAGE/ANTI CASE  
RIGID BODY MODES  
MODAL DEFOM. SUBCASE 3 MODE 3 FREQ. 0.

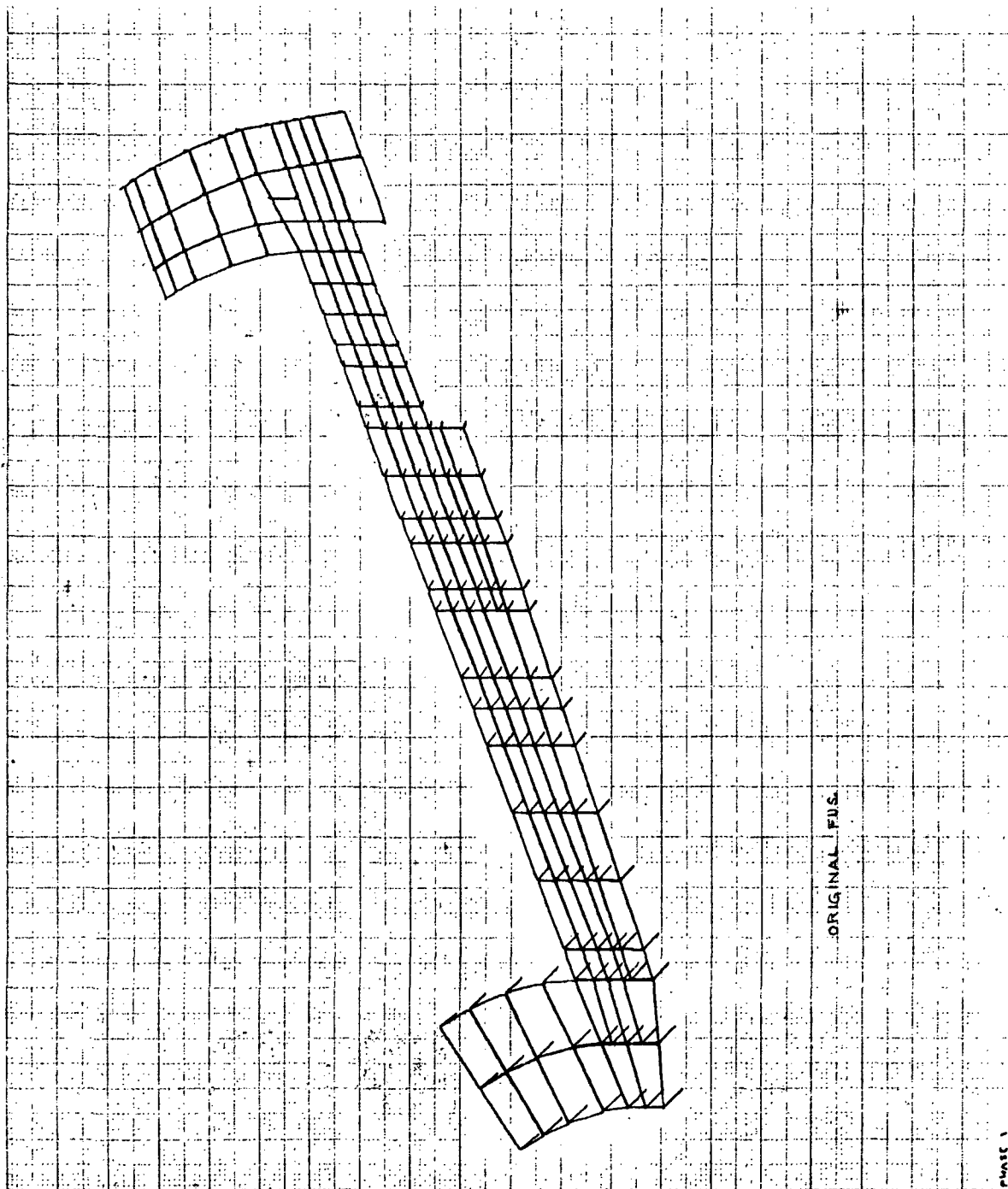


15 6/21/73 MAX-DEF. = 1.00000000



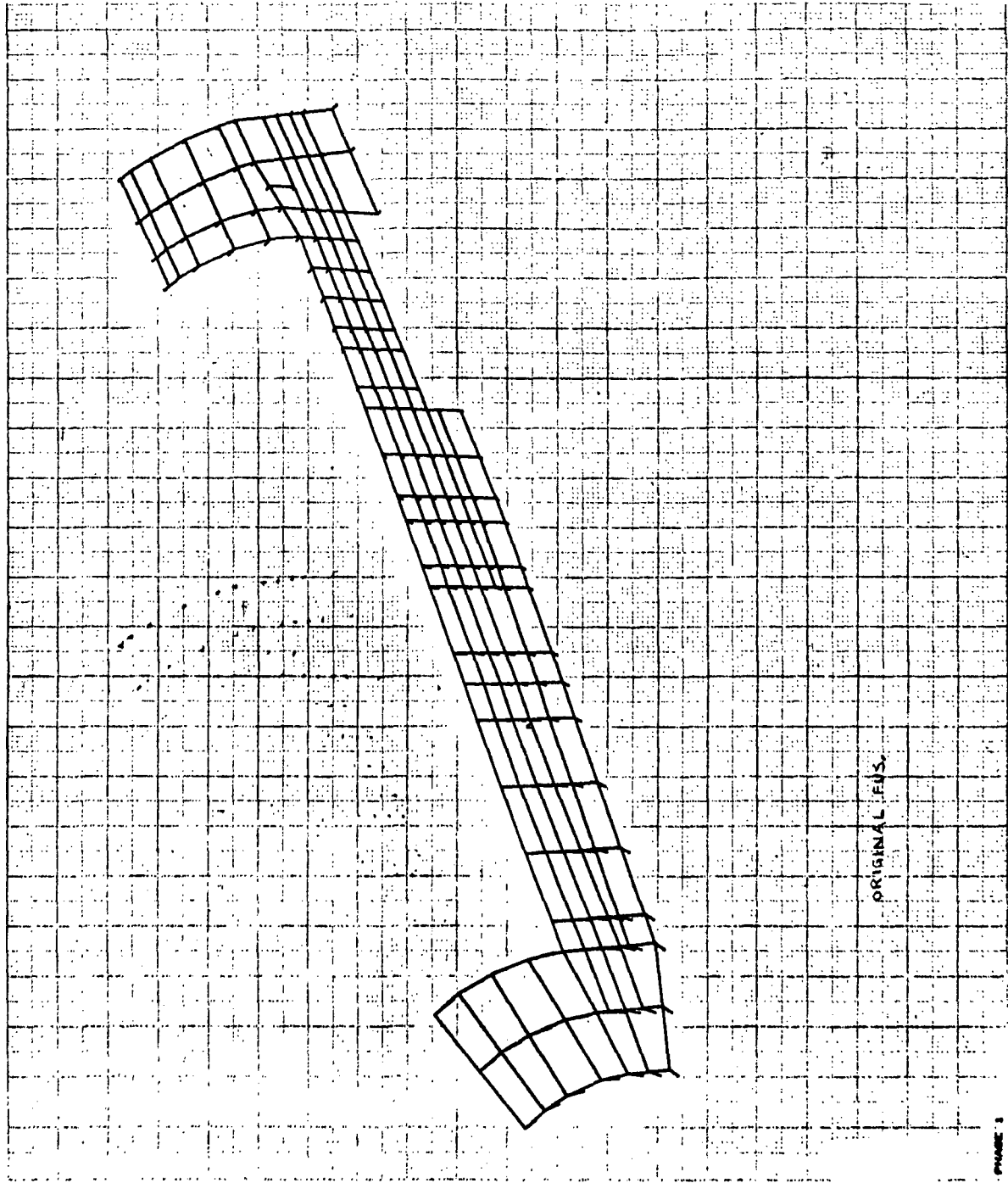
ORIGINAL FUS.

PHASE 1  
ORBITER FUSCLACE/ANTI CASE  
RIGID BODY MODES  
MODAL DEFOR. SUBCASE 3 MODE 3 FREQ. 0.



PHASE 1  
ORBITER FUSELAGE, AMP1 CASE  
RIGID BODY MODES  
MODAL ORDM. SUBCASE 3 MODE 3 FREQ. 0.

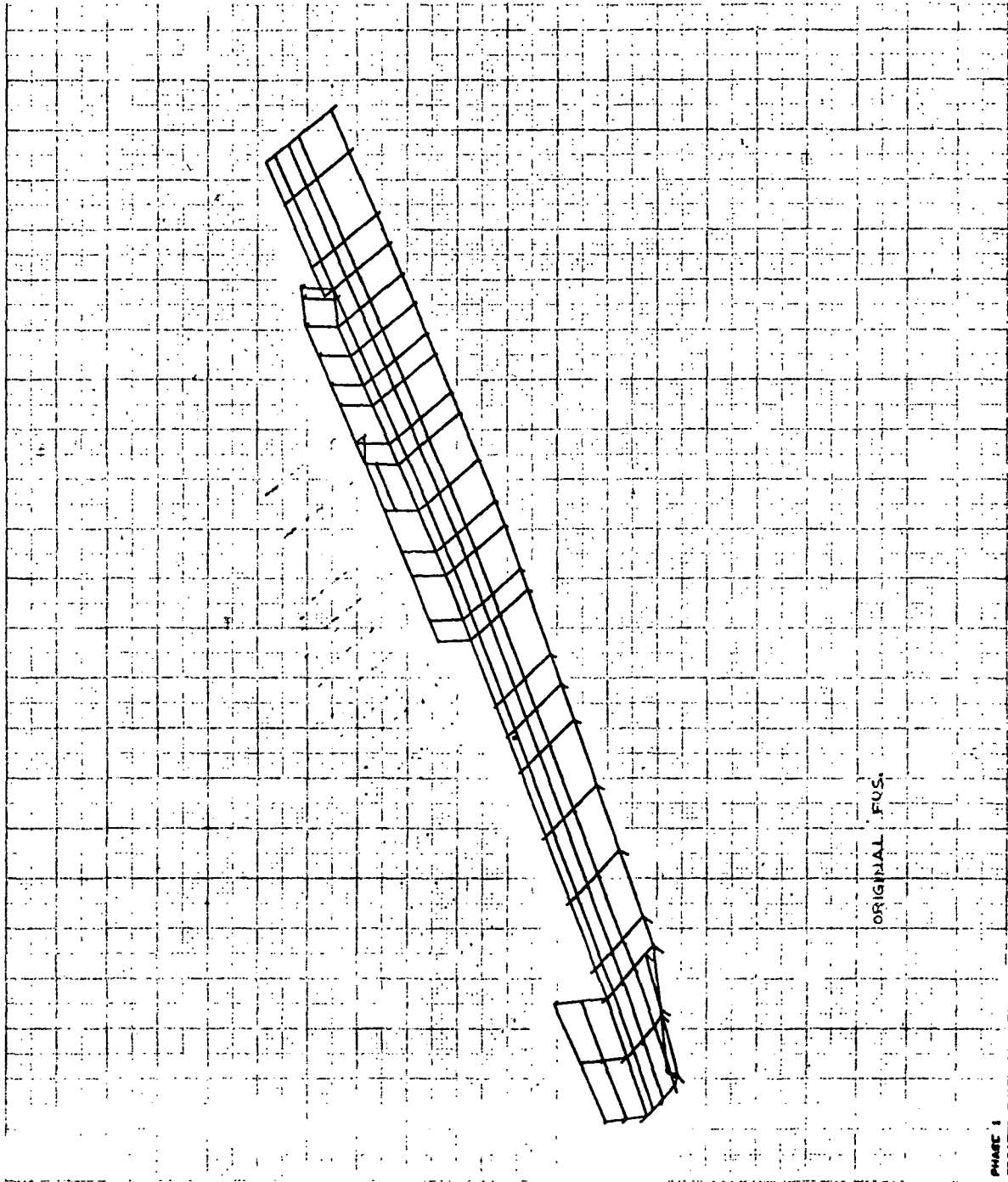
22 .. 4/20/74 MAX-DEF. = 1.09420000



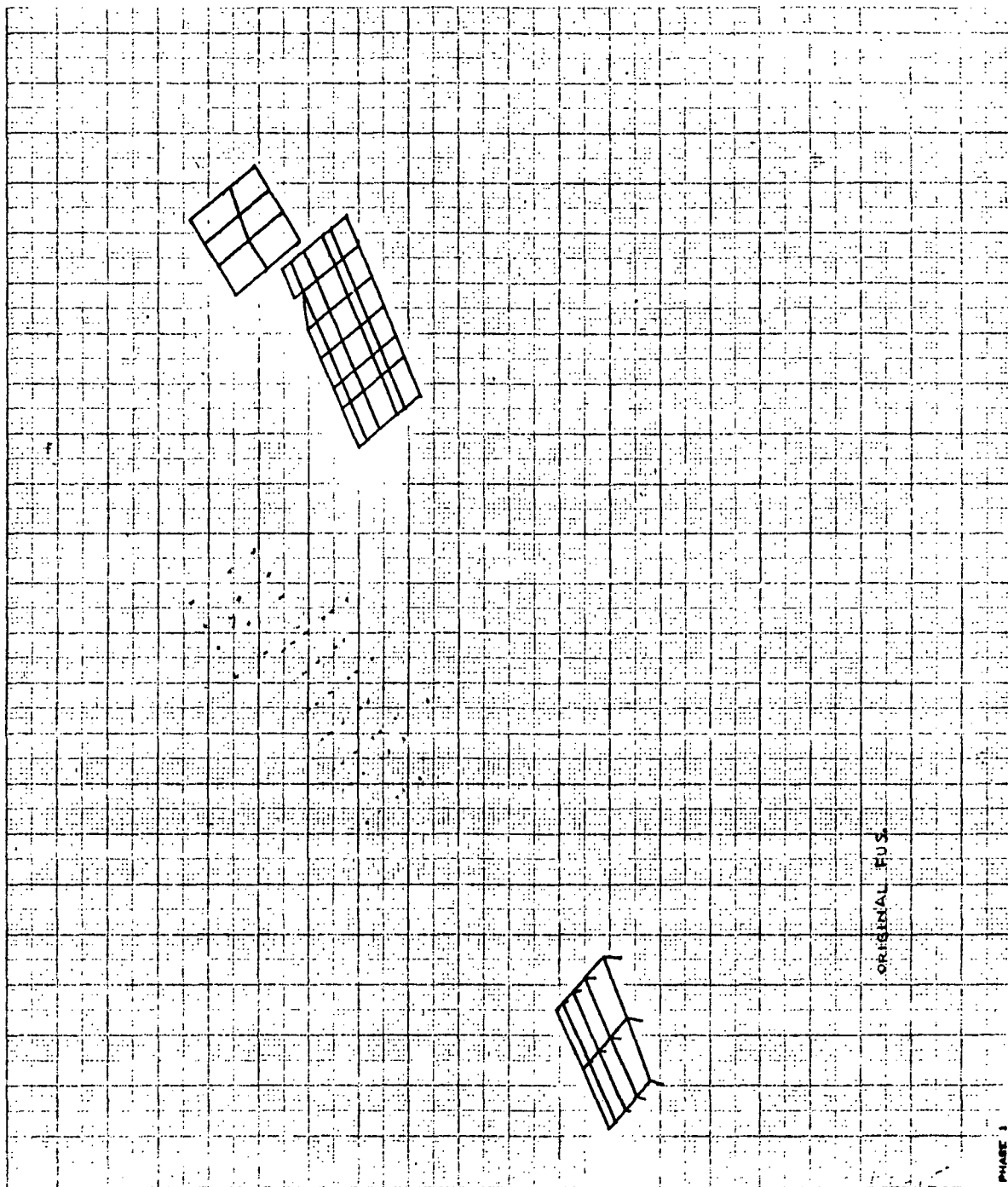
ORIGINAL PLS.

PHASE 1  
CREDIT FUELAGE, AMT CASE  
FREE FREE MODES  
MODAL DETON. SURFACE 4 MODE 4 FREE 20.70449

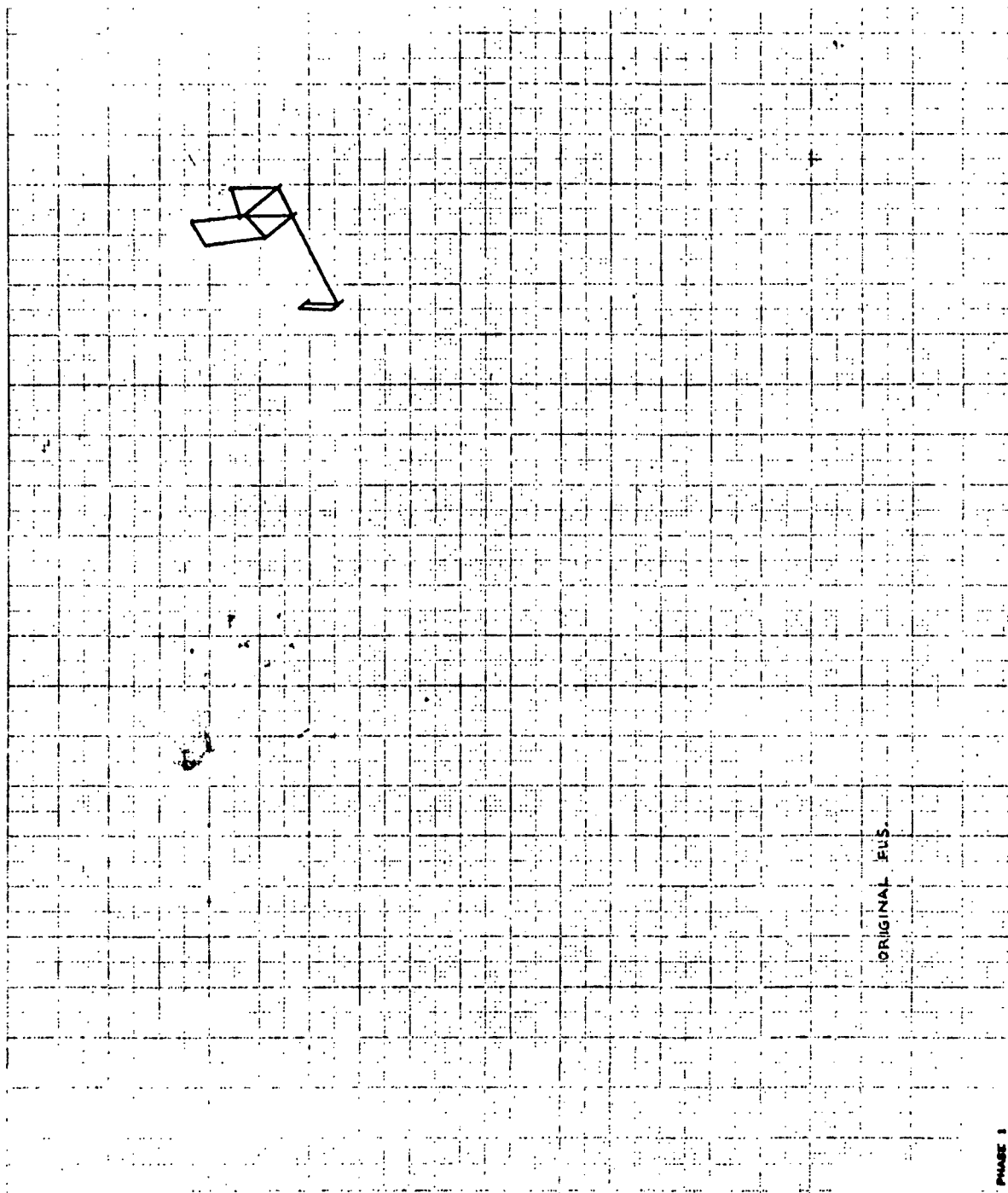
4/30/74 MAX-DEF. = 1.0123880



PHASE 1  
ORBITER FUSELAGE/ANTI CARE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 4 MODE 4 FREQ. 38.78449



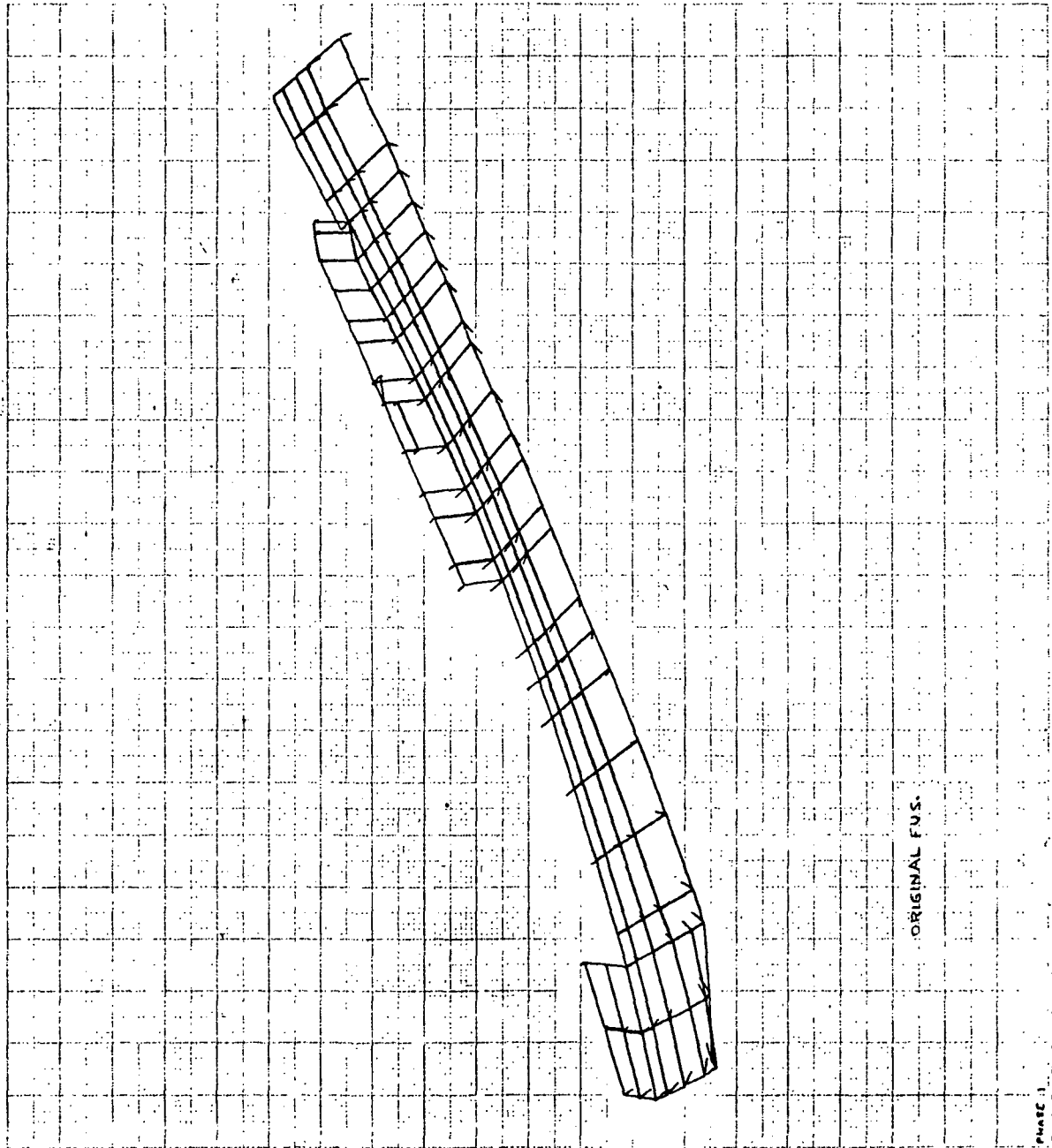
PHASE 1  
ORBITER FUELAGE, ANTI CASE  
FREE FREE MOORE  
WOMAL DEFOR. SUBCASE 4 MODE 4 FREEL 28.78449



ORIGINAL BUS.

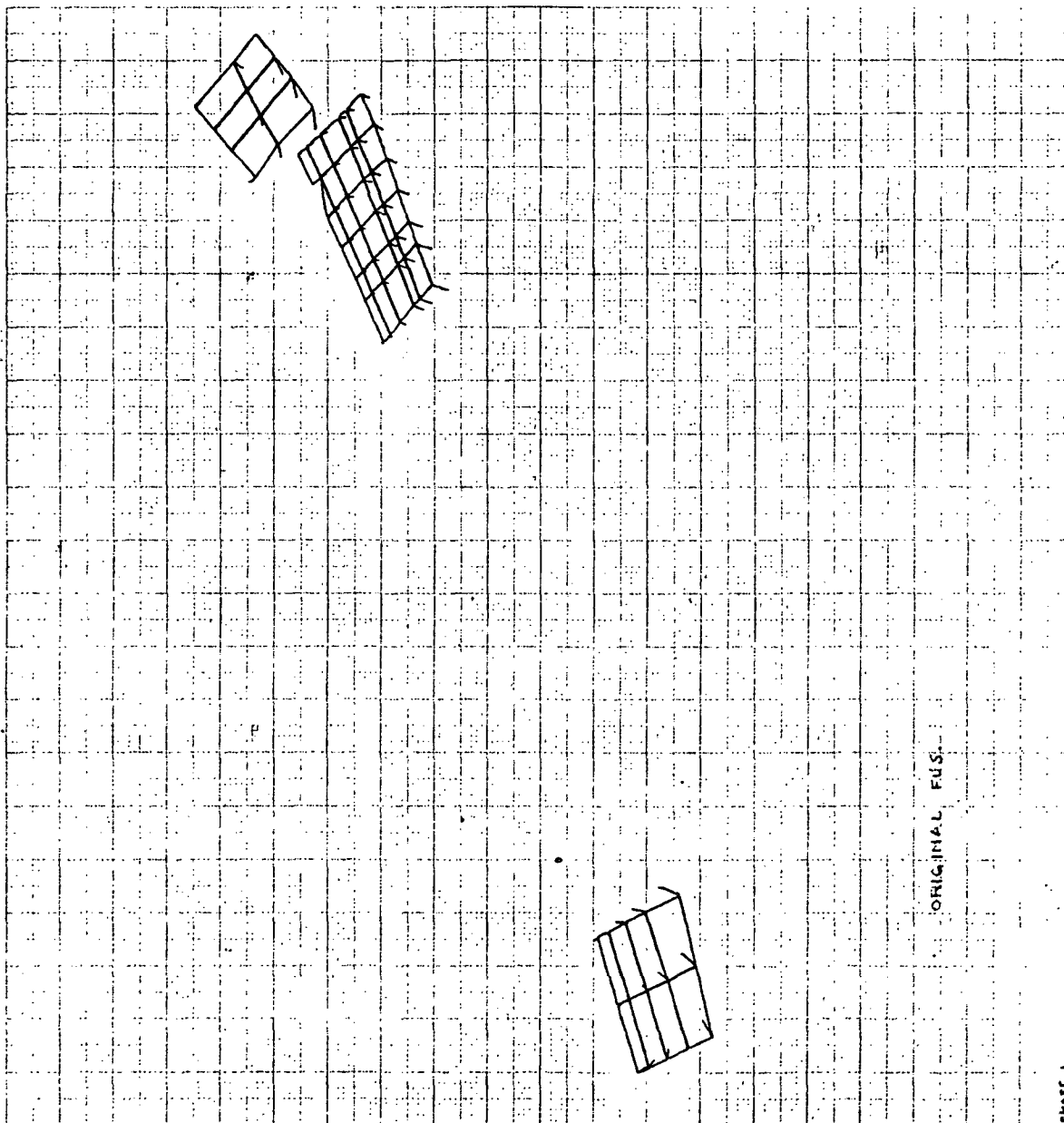
PHASE 1  
ORBITER FUELAGE/ANTI CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 4 MODE 4 FREED. 28.78449

6/21/73 MAX-DEF. = 1.0194310



PHASE 1  
ORBITER FUSELAGE, ANTI CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 4 MODE 5 FREQ. 139.3307

11 6/21/73 MAX-DEF. = 1.07843110

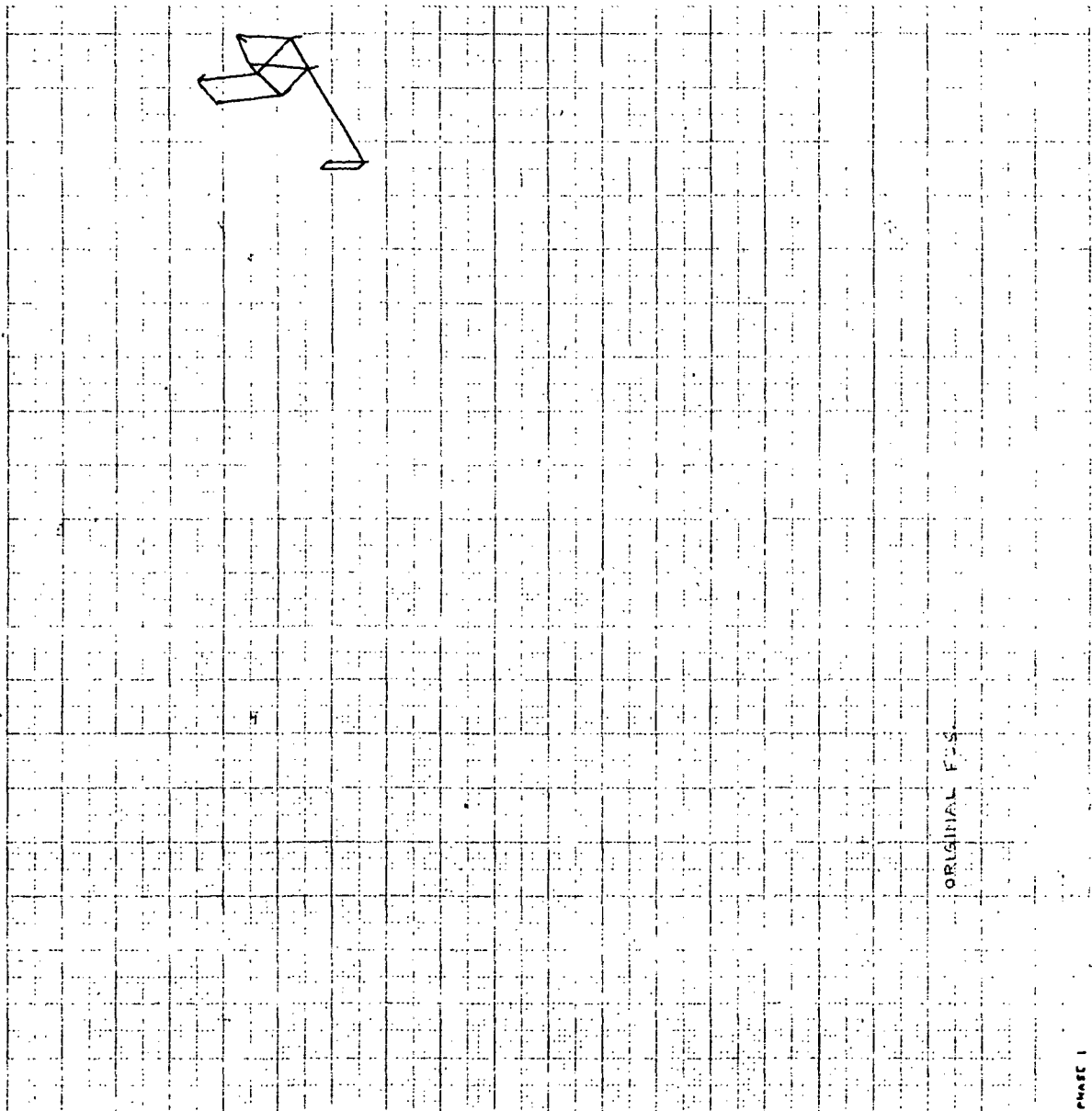


ORIGINAL FUS.

PHASE 1  
ORBITER FUSCLACC. ANTI CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 1 MODE 3 FREQ. 120.3307



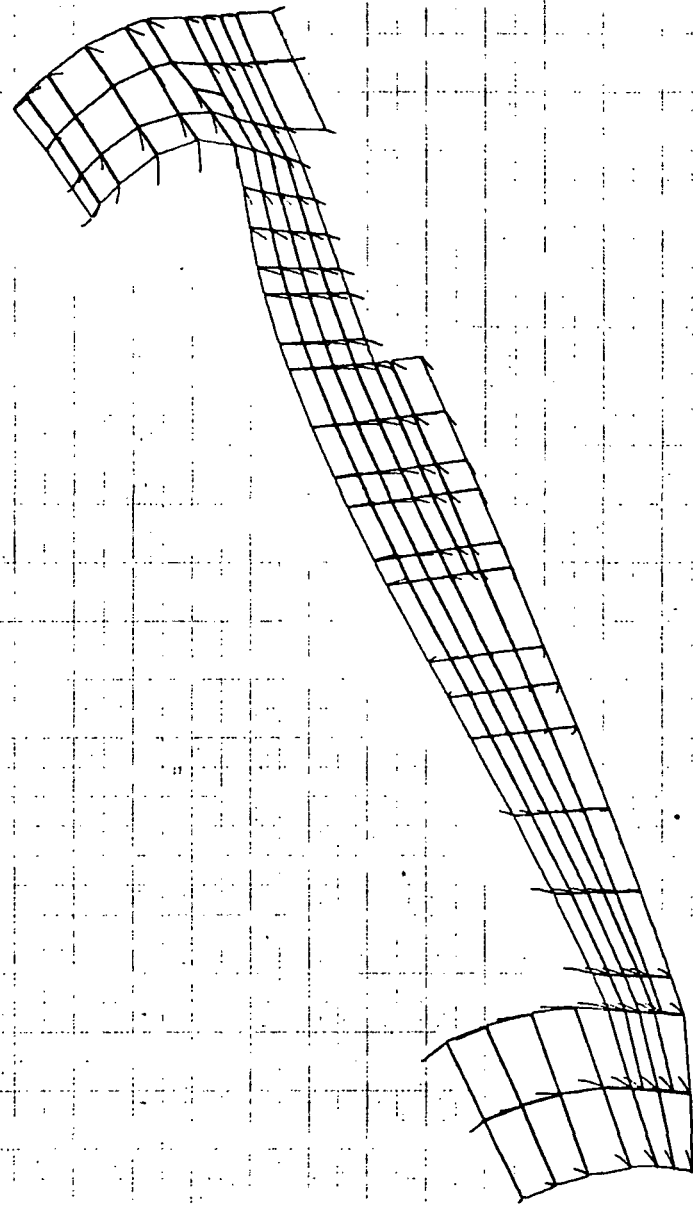
17 6/21/73 MAX-DEF. = 1.07843110



ORIGINAL FUS

PHASE 1  
ORBITER FUSELAGE/ANTI CASE  
FREE FREE MODES  
MODAL DEFORM. SUBCASE 1 MODE 5 FREQ. 138.3307

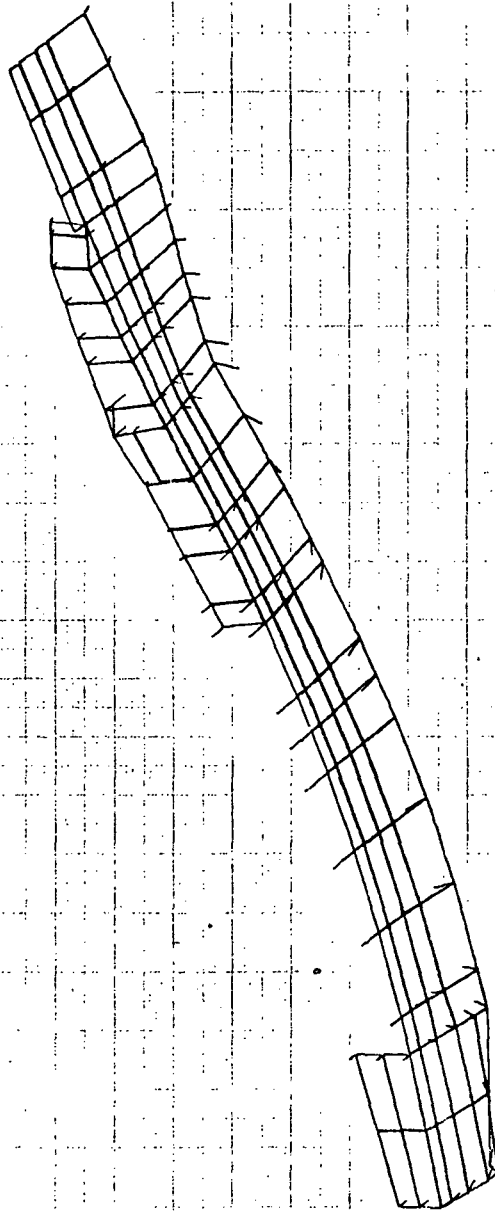
06/21/73 MAX-DEF. = 1.0E-03110



ORIGINAL P.S.

PHASE 1  
ORBITER FUSELAGE, ANTI CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 4 MODE 5 FREQ. 128.3307

6/21/73 MAY-DEF. = 1.007853 NO

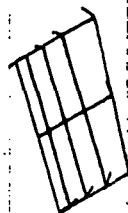
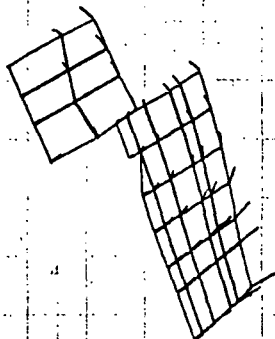


ORIGINAL FILE

PHASE 1  
ORBITER FUSELAGE, ANTI CASE  
FREE FREE MODES  
MODAL DEFOR. FUSELAGE 4 MODE 6 FREQ. 165.1879

6/21/73 MAX-DEF. = 1.00755340

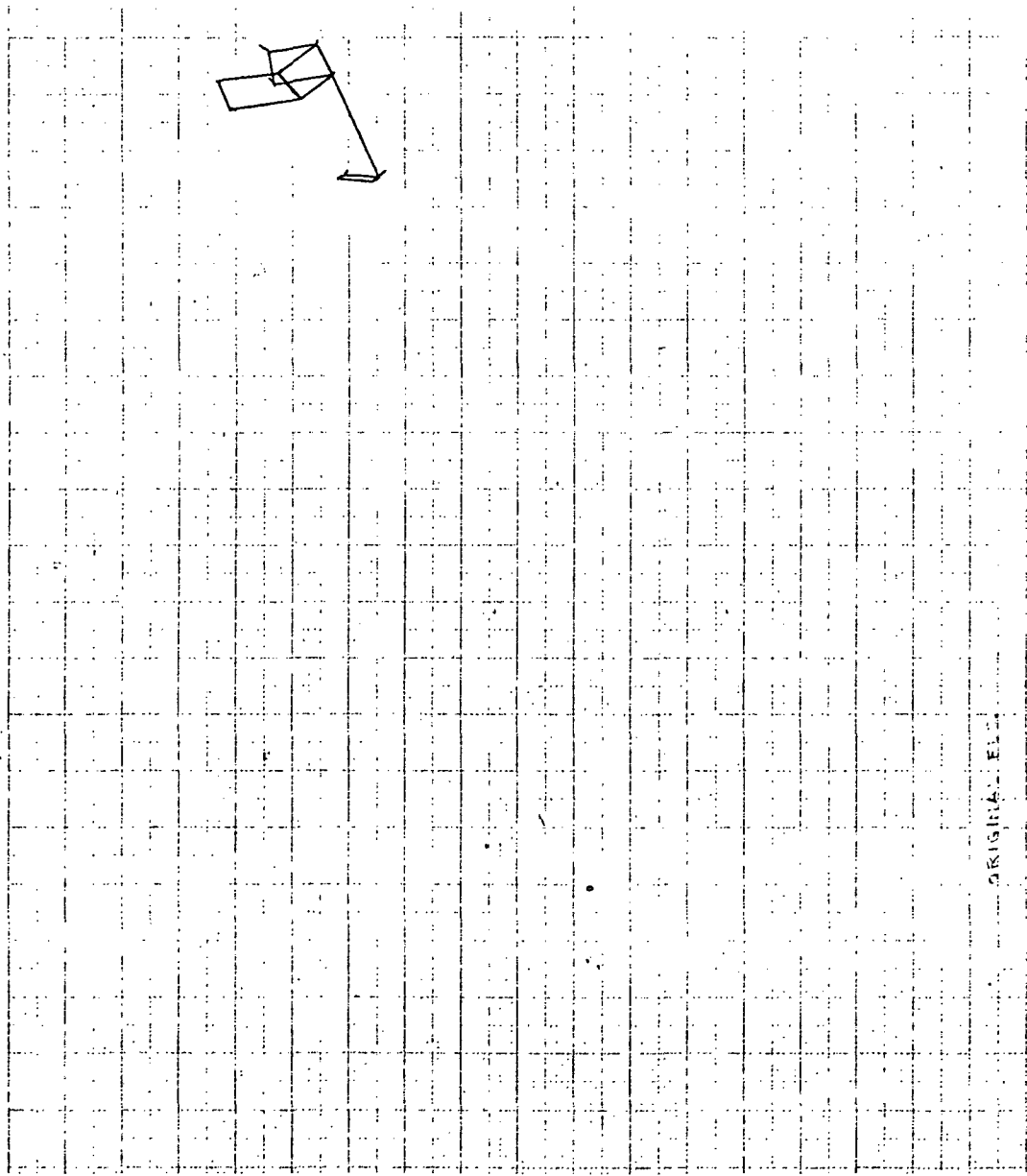
12



ORIGINAL EUS.

PHASE 3  
ORIGINAL FUSELAGE, ANTI CASE  
FREE FREE MODES  
MODAL DETON. SUBCASE 4 MODE 6 FREQ. 163.7879

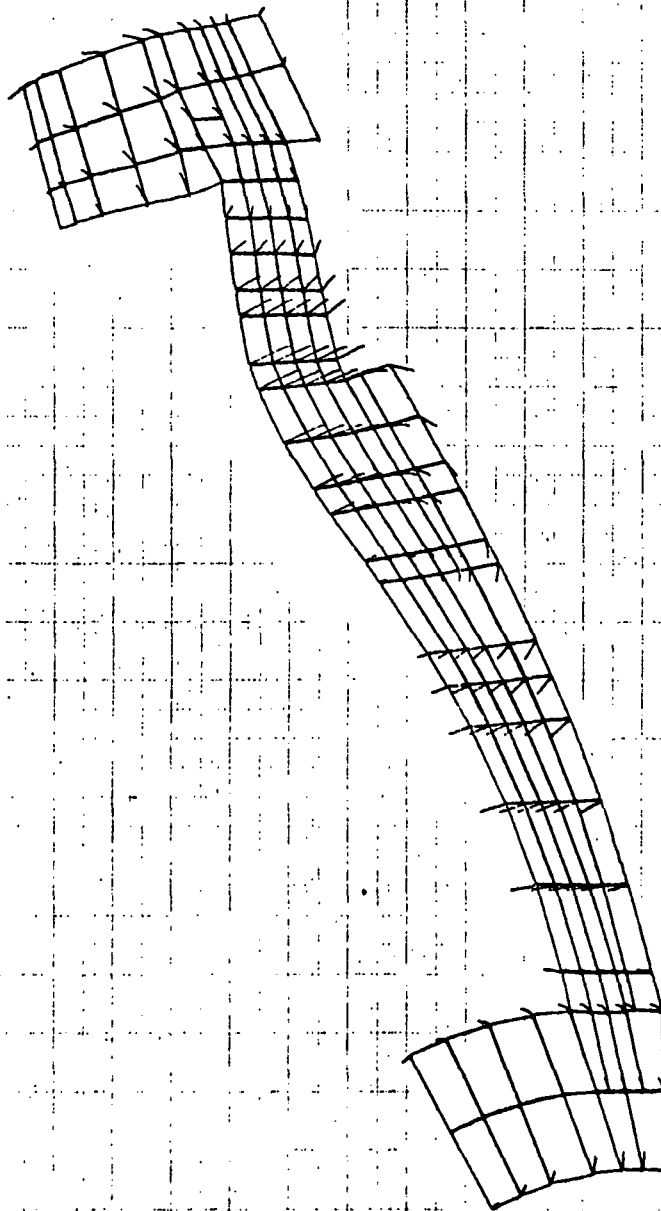
10 6/21/73 MAX-DEF. = 1.007883 NO



ORIGINAL FILE

PHASE 1  
ORBITER FUEL/CLAS. AMPL CASE  
PREC PREC MODES  
MODAL ORION. SUBCASE 4 MODE 6 PREC. 165.7894

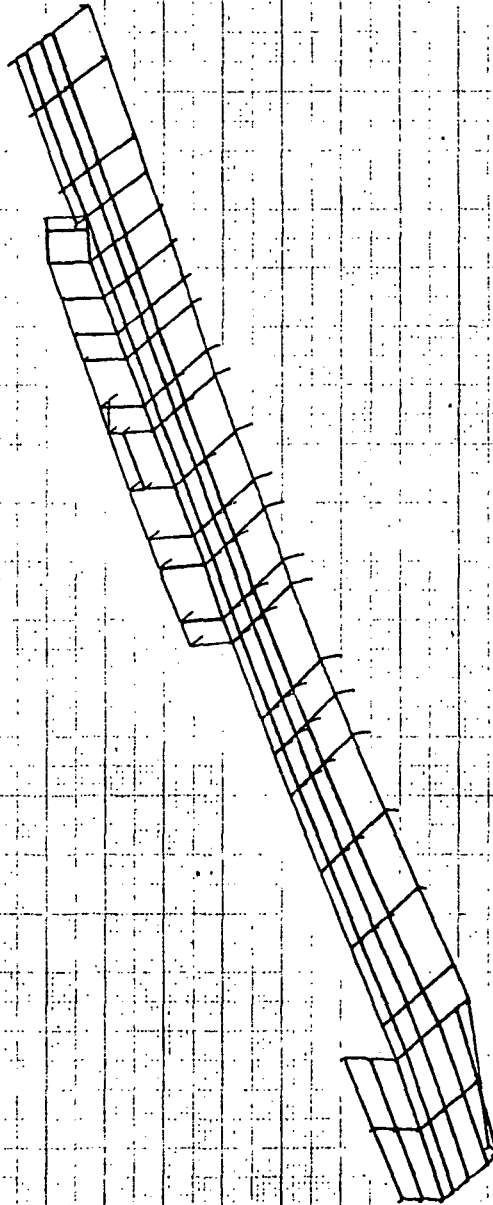
2. 6/21/73 MAX-DEF. = 1.0026540



ORIGINAL PLS.

PHASE 1  
ORBITER FUSELAGE, AUTO CASE  
FREE FREE MODES  
MODAL DEFORM. ELUCASE = MODE 8 FREQ. 165.7079

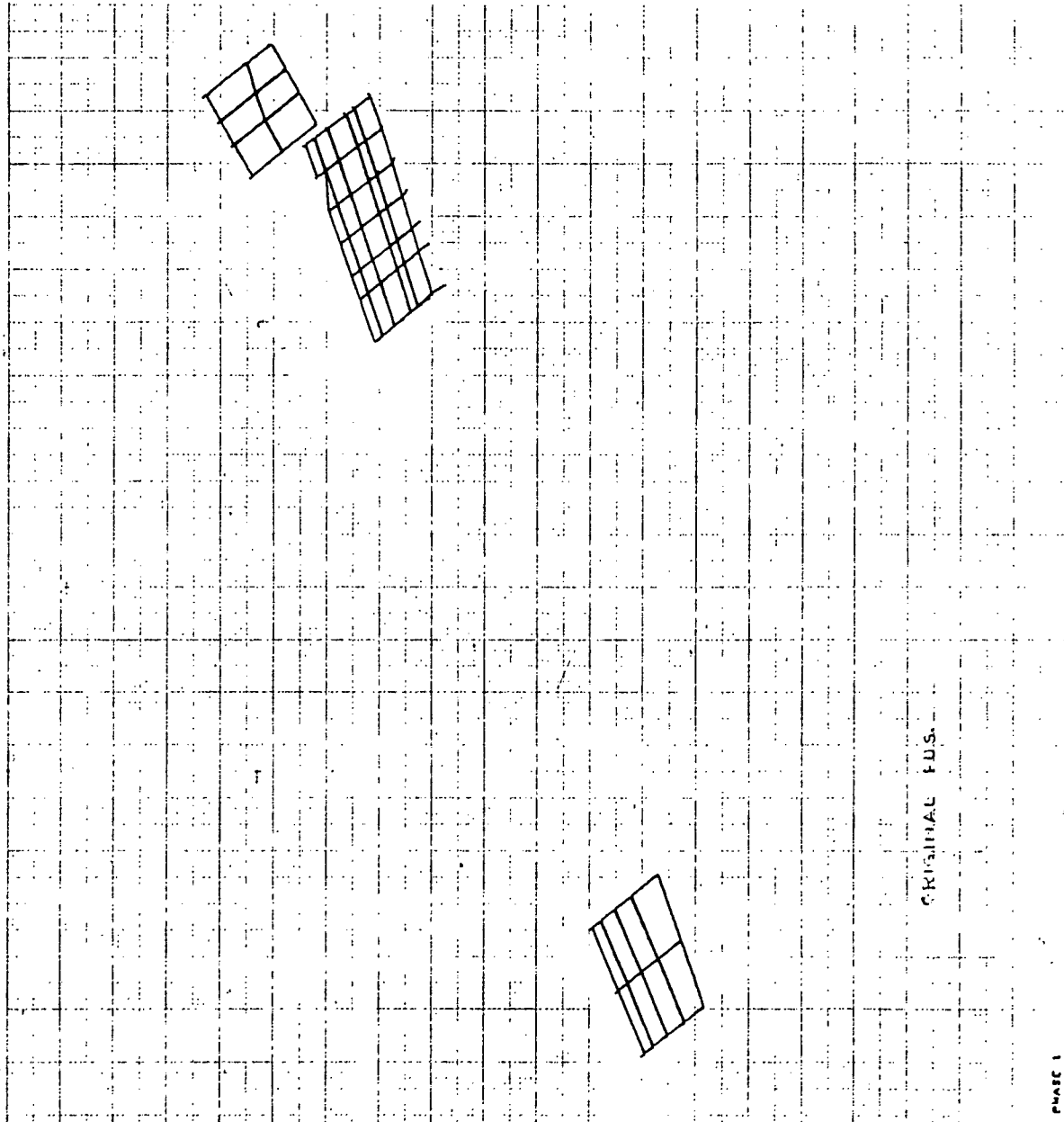
6/21/73 MAX-DEF. = 1.0000010



ORIGINAL FUS

PHASE 1  
DESIGN FUSELAGE-ANY CASE  
FACE FACE MODER  
MODAL DEFOM. SUBCASE 4 . MODER 4 . MODER 41.07443 (Out of Sequence)

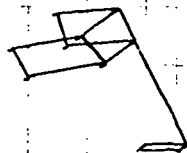
10 6/21/73 MAX-DEF. = 1.0000000



PHASE 1  
ORBITER FUSELAGE, ANTI CASE  
FACE FACE MODES  
MODAL DEFOM. SUBCASE 4 MODE 4 FACE 01.07.07 (Out of Sequence)



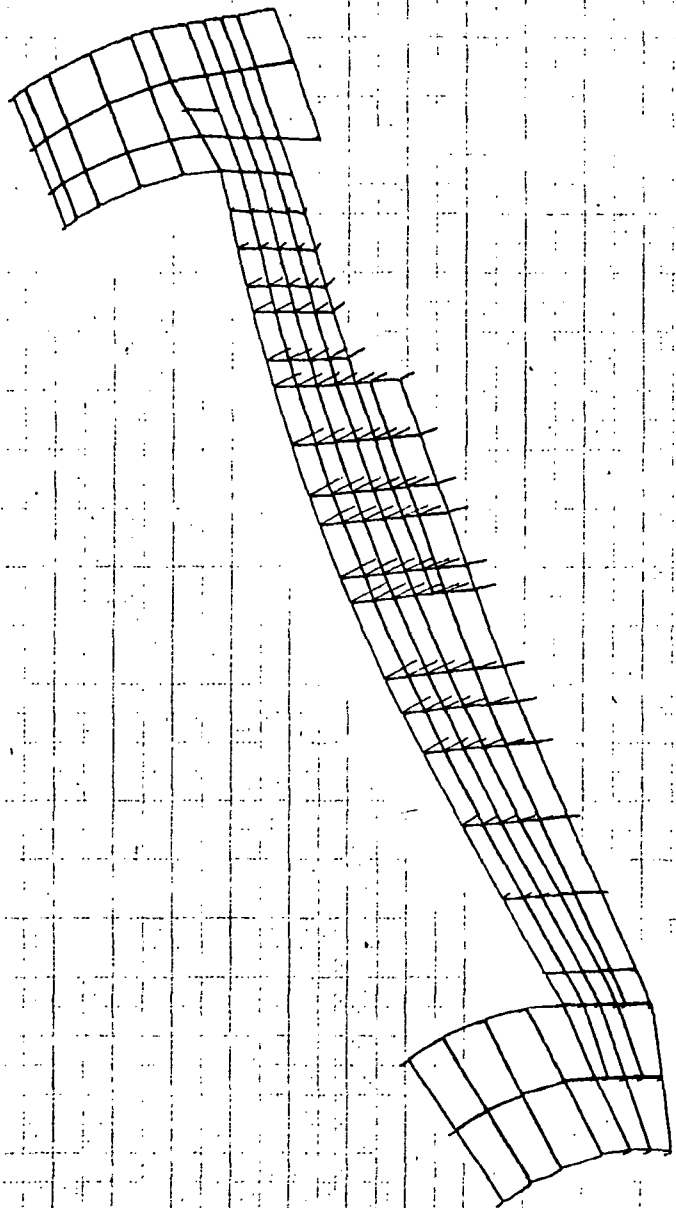
16 6/21/73 MAX-DEF. 1.003810



ORIGINAL PDS.

PHASE 1  
ORBITER FUSELAGE ANY1 CASE  
FACE FACE WOODER  
MEDAL DEFOR. SUBCASE 4 WOOD 4 FREQ. 81.07432 (Out of Sequence)

22 8/21/73 MAX-DEF. = 1.00428810  
 100% 100% 100%



ORIGINAL FIG.

PHASE 1  
 ORBITER PUSHLAGE, ANTI CASE  
 FREE FREE MODES  
 MODAL DEF. SUBCASE 1 MODE 1 FREQ. 91.57132 (Out of Sequence)

**Appendix B7**  
**SORTED BULK DATA**  
**PHASE 1 ANALYSIS: MODEL I WING**

PHASE 1%ORBITER WING  
ORIGINAL WING

CASE CONTROL DECK ECHO

CARD  
COUNT

1 TITLE # PHASE 1%ORBITER WING  
2 SUBTITLE # ORIGINAL WING  
3 MPC # 3000  
4 METHOD # 2  
5 SUBCASE 1  
6 MODES # 3  
7 LABEL # FREE MODES FIXED AT INTERFACE  
8 OUTPUT%PLOT  
9 SET 7 # SHEAR, QDMEM2  
10 PLOTTER CALCOMP 765,105  
11 AXES #MY,X,Z  
12 VIEW # 30.0,60.0,0.0  
13 MAXIMUM DEFORMATION 10.0  
14 FIND SCALE,ORIGIN 2,SET 7  
15 PLOT MODAL DEFORMATION 1 THRU 3,SET 7,ORIGIN 2,SHAPE,VECTOR 'XYZ'  
16 BEGIN BULK

PHASE 1XORBITER WING  
ORIGINAL WING

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
1-										
2-	ASET1	3	3624							
3-	ASET1	13	3651	3653	3655	3657				
4-	ASET1	123	3017	3018	3021	3022	3113	3114	3209	CAW1
5-	CAW1	3210	3213	3214	3217	3218	3221	3222	3305	CAW2
6-	CAW2	3306	3401	3402	3405	3406	3409	3410	3413	CAW3
7-	CAW3	3414	3417	3418	3421	3422	3601	3602	3605	CAW4
8-	CAW4	3606	3609	3610	3613	3614	3617	3618	3621	CAW5
9-	CAW5	3622	3652	3654	3656					
10-	ASET1	123	3658	THRU	3672					
11-	CORD2R	3000	0	.0	.0	.0	.0	3.5	47.83	EC3000
12-	EC3000	100.0	3.5	47.83						
13-	CORD2R	3001	0	-81.5683.0		35.5985	-80.2278.0		57.5136	EC3001
14-	EC3001	68.25	0.0	48.432						
15-	CORD2R	3002	3001	245.7536-16.463111.0003		245.7536-13.75	24.9514	EC3002		
16-	EC3002	300.	-16.4631	11.0003						
17-	CQDMEM2	3101	3101	3019	3119	3121	3021	0.0		
18-	CQDMEM2	3102	3101	3017	3117	3119	3019	0.0		
19-	CQDMEM2	3103	3101	3065	3115	3117	3017	0.0		
20-	CQDMEM2	3105	3101	3119	3219	3221	3121	0.0		
21-	CQDMEM2	3106	3101	3117	3217	3219	3119	0.0		
22-	CQDMEM2	3107	3101	3115	3215	3217	3117	0.0		
23-	CQDMEM2	3108	3101	3113	3213	3215	3115	0.0		
24-	CQDMEM2	3109	3101	3161	3211	3213	3113	0.0		
25-	CQDMEM2	3111	3101	3219	3319	3321	3221	0.0		
26-	CQDMEM2	3112	3101	3217	3317	3319	3219	0.0		
27-	CQDMEM2	3113	3101	3215	3315	3317	3217	0.0		
28-	CQDMEM2	3114	3101	3213	3313	3315	3215	0.0		
29-	CQDMEM2	3115	3101	3211	3311	3313	3213	0.0		
30-	CQDMEM2	3116	3101	3209	3309	3311	3211	0.0		
31-	CQDMEM2	3117	3101	3257	3307	3309	3209	0.0		
32-	CQDMEM2	3119	3101	3319	3419	3421	3321	0.0		
33-	CQDMEM2	3120	3101	3317	3417	3419	3319	0.0		
34-	CQDMEM2	3121	3101	3315	3415	3417	3317	0.0		
35-	CQDMEM2	3122	3101	3313	3413	3415	3315	0.0		
36-	CQDMEM2	3123	3101	3311	3411	3413	3313	0.0		
37-	CQDMEM2	3124	3101	3309	3409	3411	3311	0.0		
38-	CQDMEM2	3125	3101	3307	3407	3409	3309	0.0		
39-	CQDMEM2	3126	3101	3305	3405	3407	3307	0.0		
40-	CQDMEM2	3127	3101	3353	3403	3405	3305	0.0		
41-	CQDMEM2	3129	3101	3419	3469	3471	3421	0.0		
42-	CQDMEM2	3130	3101	3417	3467	3469	3419	0.0		
43-	CQDMEM2	3131	3101	3415	3465	3467	3417	0.0		
44-	CQDMEM2	3132	3101	3413	3463	3465	3415	0.0		
45-	CQDMEM2	3133	3101	3411	3461	3463	3413	0.0		
46-	CQDMEM2	3134	3101	3409	3459	3461	3411	0.0		
47-	CQDMEM2	3135	3101	3407	3457	3459	3409	0.0		
48-	CQDMEM2	3136	3101	3405	3455	3457	3407	0.0		
49-	CQDMEM2	3137	3101	3403	3453	3455	3405	0.0		
50-	CQDMEM2	3138	3101	3401	3451	3453	3403	0.0		

PHASE 1 SORTER WITH  
CDS FOR 2100

PRINTED BULK DATA FCHD

CARD COUNT	1	2	3	4	5	6	7	8	9	10
51~	CODMEM2	3139	3101	3469	3519	3521	3471	0.0		
52~	CODMEM2	3140	3101	3467	3517	3519	3469	0.0		
53~	CODMEM2	3141	3101	3465	3515	3517	3467	0.0		
54~	CODMEM2	3142	3101	3463	3513	3515	3465	0.0		
55~	CODMEM2	3143	3101	3461	3511	3513	3463	0.0		
56~	CODMEM2	3144	3101	3459	3509	3511	3461	0.0		
57~	CODMEM2	3145	3101	3457	3507	3509	3459	0.0		
58~	CODMEM2	3146	3101	3455	3505	3507	3457	0.0		
59~	CODMEM2	3147	3101	3453	3503	3505	3455	0.0		
60~	CODMEM2	3148	3101	3451	3501	3503	3453	0.0		
61~	CODMEM2	3149	3101	3519	3569	3571	3521	0.0		
62~	CODMEM2	3150	3101	3517	3567	3569	3519	0.0		
63~	CODMEM2	3151	3101	3515	3565	3567	3517	0.0		
64~	CODMEM2	3152	3101	3513	3563	3565	3515	0.0		
65~	CODMEM2	3153	3101	3511	3561	3563	3513	0.0		
66~	CODMEM2	3154	3101	3509	3559	3561	3511	0.0		
67~	CODMEM2	3155	3101	3507	3557	3559	3509	0.0		
68~	CODMEM2	3156	3101	3505	3555	3557	3507	0.0		
69~	CODMEM2	3157	3101	3503	3553	3555	3505	0.0		
70~	CODMEM2	3158	3101	3501	3551	3553	3503	0.0		
71~	CODMEM2	3159	3101	3569	3619	3621	3571	0.0		
72~	CODMEM2	3160	3101	3567	3617	3619	3569	0.0		
73~	CODMEM2	3161	3101	3565	3615	3617	3567	0.0		
74~	CODMEM2	3162	3101	3563	3613	3615	3565	0.0		
75~	CODMEM2	3163	3101	3561	3611	3613	3563	0.0		
76~	CODMEM2	3164	3101	3559	3609	3611	3561	0.0		
77~	CODMEM2	3165	3101	3557	3607	3609	3559	0.0		
78~	CODMEM2	3166	3101	3555	3605	3607	3557	0.0		
79~	CODMEM2	3167	3101	3553	3603	3605	3555	0.0		
80~	CODMEM2	3168	3101	3551	3601	3603	3553	0.0		
81~	CODMEM2	3169	3101	3619	3669	3671	3621	0.0		
82~	CODMEM2	3170	3101	3617	3667	3669	3619	0.0		
83~	CODMEM2	3171	3101	3615	3665	3667	3617	0.0		
84~	CODMEM2	3172	3101	3613	3663	3665	3615	0.0		
85~	CODMEM2	3173	3101	3611	3661	3663	3613	0.0		
86~	CODMEM2	3174	3101	3609	3659	3661	3611	0.0		
87~	CODMEM2	3175	3101	3607	3657	3659	3609	0.0		
88~	CODMEM2	3176	3101	3605	3655	3657	3607	0.0		
89~	CODMEM2	3177	3101	3603	3653	3655	3605	0.0		
90~	CODMEM2	3178	3101	3601	3651	3653	3603	0.0		
91~	CODMEM2	3201	3101	3020	3120	3122	3022	0.0		
92~	CODMEM2	3202	3101	3018	3118	3120	3020	0.0		
93~	CODMEM2	3203	3101	3066	3116	3118	3018	0.0		
94~	CODMEM2	3205	3101	3120	3220	3222	3122	0.0		
95~	CODMEM2	3206	3101	3118	3218	3220	3120	0.0		
96~	CODMEM2	3207	3101	3116	3216	3218	3118	0.0		
97~	CODMEM2	3208	3101	3114	3214	3216	3116	0.0		
98~	CODMEM2	3209	3101	3162	3212	3214	3114	0.0		
99~	CODMEM2	3211	3101	3220	3320	3322	3222	0.0		
100~	CODMEM2	3212	3101	3218	3318	3320	3220	0.0		

PHASE 1XOREBITER WING  
ORIGINAL WING

SORTED BULK DATA ECHO

CARD	COUNT	1	2	3	4	5	6	7	8	9	10
101-	CQDMEM2	3213	3101	3216	3316	3318	3218	0.0			
102-	CQDMEM2	3214	3101	3214	3314	3316	3216	0.0			
103-	CQDMEM2	3215	3101	3212	3312	3314	3214	0.0			
104-	CQDMEM2	3216	3101	3210	3310	3312	3212	0.0			
105-	CQDMEM2	3217	3101	3258	3308	3310	3210	0.0			
106-	CQDMEM2	3219	3101	3320	3420	3422	3322	0.0			
107-	CQDMEM2	3220	3101	3318	3418	3420	3320	0.0			
108-	CQDMEM2	3221	3101	3316	3416	3418	3318	0.0			
109-	CQDMEM2	3222	3101	3314	3414	3416	3316	0.0			
110-	CQDMEM2	3223	3101	3312	3412	3414	3314	0.0			
111-	CQDMEM2	3224	3101	3310	3410	3412	3312	0.0			
112-	CQDMEM2	3225	3101	3308	3408	3410	3310	0.0			
113-	CQDMEM2	3226	3101	3306	3406	3408	3308	0.0			
114-	CQDMEM2	3227	3101	3354	3404	3406	3306	0.0			
115-	CQDMEM2	3229	3101	3420	3470	3472	3422	0.0			
116-	CQDMEM2	3230	3101	3418	3468	3470	3420	0.0			
117-	CQDMEM2	3231	3101	3416	3466	3468	3418	0.0			
118-	CQDMEM2	3232	3101	3414	3464	3466	3416	0.0			
119-	CQDMEM2	3233	3101	3412	3462	3464	3414	0.0			
120-	CQDMEM2	3234	3101	3410	3460	3462	3412	0.0			
121-	CQDMEM2	3235	3101	3408	3458	3460	3410	0.0			
122-	CQDMEM2	3236	3101	3406	3456	3458	3408	0.0			
123-	CQDMEM2	3237	3101	3404	3454	3456	3406	0.0			
124-	CQDMEM2	3238	3101	3402	3452	3454	3404	0.0			
125-	CQDMEM2	3239	3101	3470	3520	3522	3472	0.0			
126-	CQDMEM2	3240	3101	3468	3518	3520	3470	0.0			
127-	CQDMEM2	3241	3101	3466	3516	3518	3468	0.0			
128-	CQDMEM2	3242	3101	3464	3514	3516	3466	0.0			
129-	CQDMEM2	3243	3101	3462	3512	3514	3464	0.0			
130-	CQDMEM2	3244	3101	3460	3510	3512	3462	0.0			
131-	CQDMEM2	3245	3101	3458	3508	3510	3460	0.0			
132-	CQDMEM2	3246	3101	3456	3506	3508	3458	0.0			
133-	CQDMEM2	3247	3101	3454	3504	3506	3456	0.0			
134-	CQDMEM2	3248	3101	3452	3502	3504	3454	0.0			
135-	CQDMEM2	3249	3101	3520	3570	3572	3522	0.0			
136-	CQDMEM2	3250	3101	3518	3568	3574	3524	0.0			
137-	CQDMEM2	3251	3101	3516	3566	3568	3518	0.0			
138-	CQDMEM2	3252	3101	3514	3564	3566	3516	0.0			
139-	CQDMEM2	3253	3101	3512	3562	3564	3514	0.0			
140-	CQDMEM2	3254	3101	3510	3560	3562	3512	0.0			
141-	CQDMEM2	3255	3101	3508	3558	3560	3510	0.0			
142-	CQDMEM2	3256	3101	3506	3556	3558	3508	0.0			
143-	CQDMEM2	3257	3101	3504	3554	3556	3506	0.0			
144-	CQDMEM2	3258	3101	3502	3552	3554	3504	0.0			
145-	CQDMEM2	3259	3101	3570	3620	3622	3572	0.0			
146-	CQDMEM2	3260	3101	3568	3618	3624	3574	0.0			
147-	CQDMEM2	3261	3101	3566	3616	3618	3568	0.0			
148-	CQDMEM2	3262	3101	3564	3614	3616	3566	0.0			
149-	CQDMEM2	3263	3101	3562	3612	3614	3564	0.0			
150-	CQDMEM2	3264	3101	3560	3610	3612	3562	0.0			

PHASE 12 ORBITER WING  
ORIGINAL WING

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
151-	CODMEM2	3265	3101	3553	3608	3610	3550	0.0		
152-	CODMEM2	3266	3101	3556	3606	3608	3558	0.0		
153-	CODMEM2	3267	3101	3554	3604	3606	3556	0.0		
154-	CODMEM2	3268	3101	3552	3602	3604	3554	0.0		
155-	CODMEM2	3269	3101	3620	3670	3672	3622	0.0		
156-	CODMEM2	3270	3101	3524	3574	3570	3520	0.0		
157-	CODMEM2	3271	3101	3616	3666	3668	3618	0.0		
158-	CODMEM2	3272	3101	3614	3664	3666	3616	0.0		
159-	CODMEM2	3273	3101	3612	3662	3664	3614	0.0		
160-	CODMEM2	3274	3101	3610	3660	3662	3612	0.0		
161-	CODMEM2	3275	3101	3608	3658	3660	3610	0.0		
162-	CODMEM2	3276	3101	3606	3656	3658	3608	0.0		
163-	CODMEM2	3277	3101	3604	3654	3656	3606	0.0		
164-	CODMEM2	3278	3101	3602	3652	3654	3604	0.0		
165-	CODMEM2	3279	3101	3574	3624	3620	3570	0.0		
166-	CRUD	3401	3401	3021	3121	3402	3401	3022	3122	
167-	CRUD	3403	3401	3017	3117	3404	3401	3018	3118	
168-	CRUD	3405	3405	3121	3221	3406	3405	3122	3222	
169-	CRUD	3407	3405	3117	3217	3408	3405	3118	3218	
170-	CRUD	3409	3405	3113	3213	3410	3405	3114	3214	
171-	CRUD	3411	3411	3221	3321	3412	3411	3222	3322	
172-	CRUD	3413	3411	3217	3317	3414	3411	3218	3318	
173-	CRUD	3415	3411	3213	3313	3416	3411	3214	3314	
174-	CRUD	3417	3411	3209	3309	3418	3411	3210	3310	
175-	CRUD	3419	3419	3321	3421	3420	3419	3322	3422	
176-	CRUD	3421	3419	3317	3417	3422	3419	3318	3418	
177-	CRUD	3423	3419	3313	3413	3424	3419	3314	3414	
178-	CRUD	3425	3419	3309	3409	3426	3419	3310	3410	
179-	CRUD	3427	3419	3305	3405	3428	3419	3306	3406	
180-	CRUD	3429	3429	3421	3471	3430	3429	3422	3472	
181-	CRUD	3431	3429	3417	3467	3432	3429	3418	3468	
182-	CRUD	3433	3429	3413	3463	3434	3429	3414	3464	
183-	CRUD	3435	3429	3409	3459	3436	3429	3410	3460	
184-	CRUD	3437	3429	3405	3455	3438	3429	3406	3456	
185-	CRUD	3439	3429	3401	3451	3440	3429	3402	3452	
186-	CRUD	3441	3441	3471	3521	3442	3441	3472	3522	
187-	CRUD	3443	3441	3467	3517	3444	3441	3468	3518	
188-	CRUD	3445	3441	3463	3513	3446	3441	3464	3514	
189-	CRUD	3447	3441	3459	3509	3448	3441	3460	3510	
190-	CRUD	3449	3441	3455	3505	3450	3441	3456	3506	
191-	CRUD	3451	3441	3451	3501	3452	3441	3452	3502	
192-	CRUD	3453	3453	3521	3571	3454	3453	3522	3572	
193-	CRUD	3455	3453	3517	3567	3456	3453	3518	3568	
194-	CRUD	3457	3453	3513	3563	3458	3453	3514	3564	
195-	CRUD	3459	3453	3509	3559	3460	3453	3510	3560	
196-	CRUD	3461	3453	3505	3555	3462	3453	3506	3556	
197-	CRUD	3463	3453	3501	3551	3464	3453	3502	3552	
198-	CRUD	3465	3465	3571	3621	3466	3465	3572	3622	
199-	CRUD	3467	3465	3567	3617	3468	3465	3568	3618	
200-	CRUD	3469	3465	3563	3613	3470	3465	3564	3614	



PHASE 1XORBITER WING  
ORIGINAL WING

SORTED BULK DATA ECHO

CARD	COUNT	1	2	3	4	5	6	7	8	9	10
201- CRD		3471	3465	3559	3609	3472	3465	3560	3610		
202- CRD		3473	3465	3555	3605	3474	3465	3556	3606		
203- CRD		3475	3465	3551	3601	3476	3465	3552	3602		
204- CRD		3477	3477	3021	3019	3478	3477	3022	3020		
205- CRD		3479	3477	3019	3017	3480	3477	3020	3018		
206- CRD		3481	3481	3017	3065	3482	3481	3018	3066		
207- CRD		3483	3483	3065	3113	3484	3483	3066	3114		
208- CRD		3485	3485	3113	3161	3486	3485	3114	3162		
209- CRD		3487	3487	3161	3209	3488	3487	3162	3210		
210- CRD		3489	3489	3209	3257	3490	3489	3210	3258		
211- CRD		3491	3491	3257	3305	3492	3491	3258	3306		
212- CRD		3493	3493	3305	3353	3494	3493	3306	3354		
213- CRD		3495	3495	3353	3401	3496	3495	3354	3402		
214- CRD		3497	3497	3621	3619	3498	3497	3622	3620		
215- CRD		3499	3497	3619	3623	3500	3497	3620	3624		
216- CRD		3501	3497	3623	3617	3502	3497	3624	3618		
217- CRD		3503	3497	3617	3615	3504	3497	3618	3616		
218- CRD		3505	3497	3615	3613	3506	3497	3616	3614		
219- CRD		3507	3497	3613	3611	3508	3497	3614	3612		
220- CRD		3509	3497	3611	3609	3510	3497	3612	3610		
221- CRD		3511	3497	3609	3607	3512	3497	3610	3608		
222- CRD		3513	3497	3607	3605	3514	3497	3608	3606		
223- CRD		3515	3497	3605	3603	3516	3497	3606	3604		
224- CRD		3517	3497	3603	3601	3518	3497	3604	3602		
225- CRD		3519	3519	3021	3022	3532	3519	3017	3018		
226- CRD		3520	3520	3121	3122	3528	3520	3019	3020		
227- CRD		3521	3519	3221	3222	3534	3519	3217	3218		
228- CRD		3522	3520	3321	3322	3529	3520	3219	3220		
229- CRD		3523	3519	3421	3422	3536	3519	3417	3418		
230- CRD		3524	3520	3471	3472	3530	3520	3419	3420		
231- CRD		3525	3520	3521	3522	3531	3520	3619	3620		
232- CRD		3526	3520	3571	3572	3541	3520	3065	3066		
233- CRD		3527	3527	3621	3622						
234- CRD		3533	3520	3117	3118	3542	3520	3215	3216		
235- CRD		3535	3520	3317	3318	3543	3520	3415	3416		
236- CRD		3537	3520	3467	3468	3544	3520	3615	3616		
237- CRD		3538	3520	3517	3518	3553	3520	3161	3162		
238- CRD		3539	3520	3567	3568	3554	3520	3211	3212		
239- CRD		3540	3527	3617	3618						
240- CRD		3545	3519	3113	3114	3557	3519	3209	3210		
241- CRD		3546	3519	3213	3214	3559	3519	3409	3410		
242- CRD		3547	3520	3313	3314	3555	3520	3411	3412		
243- CRD		3548	3519	3413	3414	3567	3519	3305	3306		
244- CRD		3549	3520	3463	3464	3556	3520	3611	3612		
245- CRD		3550	3520	3513	3514	3564	3520	3257	3258		
246- CRD		3551	3520	3563	3564	3565	3520	3407	3408		
247- CRD		3552	3527	3613	3614						
248- CRD		3558	3520	3309	3310	3566	3520	3607	3608		
249- CRD		3560	3520	3459	3460	3573	3520	3353	3354		
250- CRD		3561	3520	3509	3510	3574	3520	3403	3404		

PHASE 10 OFFITEE WING  
ORIGINAL WING

SORTED BULK DATA FCHO

CARD	1	2	3	4	5	6	7	8	9	10
COUNT	1	2	3	4	5	6	7	8	9	10
251- CRDD	3562	3520	3559	3560	3575	3520	3603	3604		
252- CRDD	3563	3527	3569	3610						
253- CRDD	3568	3519	3405	3406	3576	3519	3401	3402		
254- CRDD	3569	3520	3455	3456	3577	3520	3451	3452		
255- CRDD	3570	3520	3505	3506	3578	3520	3501	3502		
256- CRDD	3571	3520	3555	3556	3579	3520	3551	3552		
257- CRDD	3572	3521	3605	3606						
258- CRDD	3580	3581	3601	3602						
259- CRDD	3581	3581	3623	3624						
260- CRDD	3582	3581	3624	3574						
261- CRDD	3583	3583	3671	3672						
262- CRDD	3584	3583	3667	3668						
263- CRDD	3585	3593	3663	3664						
264- CRDD	3586	3583	3659	3660						
265- CRDD	3587	3583	3651	3652						
266- CSHEAR	3301	3301	3020	3019	3021	3022				
267- CSHEAR	3302	3301	3018	3017	3019	3020				
268- CSHEAR	3303	3301	3066	3065	3017	3018				
269- CSHEAR	3304	3301	3114	3113	3065	3066				
270- CSHEAR	3305	3301	3162	3161	3113	3114				
271- CSHEAR	3306	3301	3210	3209	3151	3152				
272- CSHEAR	3307	3301	3258	3257	3209	3210				
273- CSHEAR	3308	3301	3306	3305	3257	3258				
274- CSHEAR	3309	3301	3354	3353	3305	3306				
275- CSHEAR	3310	3301	3402	3401	3353	3354				
276- CSHEAR	3311	3311	3220	3219	3221	3222				
277- CSHEAR	3312	3311	3218	3217	3219	3220				
278- CSHEAR	3313	3311	3216	3215	3217	3218				
279- CSHEAR	3314	3311	3214	3213	3215	3216				
280- CSHEAR	3315	3311	3212	3211	3213	3214				
281- CSHEAR	3316	3311	3210	3209	3211	3212				
282- CSHEAR	3317	3311	3420	3419	3421	3422				
283- CSHEAR	3318	3311	3418	3417	3419	3420				
284- CSHEAR	3319	3311	3416	3415	3417	3418				
285- CSHEAR	3320	3311	3414	3413	3415	3416				
286- CSHEAR	3321	3311	3412	3411	3413	3414				
287- CSHEAR	3322	3311	3410	3409	3411	3412				
288- CSHEAR	3323	3311	3408	3407	3409	3410				
289- CSHEAR	3324	3311	3406	3405	3407	3408				
290- CSHEAR	3325	3311	3404	3403	3405	3406				
291- CSHEAR	3326	3311	3402	3401	3403	3404				
292- CSHEAR	3327	3301	3620	3619	3621	3622				
293- CSHEAR	3328	3301	3620	3624	3623	3619				
294- CSHEAR	3329	3301	3624	3618	3617	3623				
295- CSHEAR	3330	3301	3616	3615	3617	3618				
296- CSHEAR	3331	3301	3614	3613	3615	3616				
297- CSHEAR	3332	3301	3612	3611	3613	3614				
298- CSHEAR	3333	3301	3610	3609	3611	3612				
299- CSHEAR	3334	3301	3608	3607	3609	3610				
300- CSHEAR	3335	3301	3606	3605	3607	3608				

PHASE I HORRITER WING  
ORIGINAL WING

SORTED BULK DATA ECHO

CARD	1	2	3	4	5	6	7	8	9	10
COUNT	1	2	3	4	5	6	7	8	9	10
301-	CSHEAR	3336	3301	3504	3603	3605	3606			
302-	CSHEAR	3337	3301	3602	3601	3603	3604			
303-	CSHEAR	3338	3301	3022	3021	3121	3122			
304-	CSHEAR	3339	3301	3122	3121	3221	3222			
305-	CSHEAR	3340	3301	3222	3221	3321	3322			
306-	CSHEAR	3341	3301	3322	3321	3421	3422			
307-	CSHEAR	3342	3301	3422	3421	3471	3472			
308-	CSHEAR	3343	3301	3472	3471	3521	3522			
309-	CSHEAR	3344	3301	3522	3521	3571	3572			
310-	CSHEAR	3345	3301	3572	3571	3621	3622			
311-	CSHEAR	3346	3301	3018	3017	3117	3118			
312-	CSHEAR	3347	3301	3118	3117	3217	3218			
313-	CSHEAR	3348	3301	3218	3217	3317	3318			
314-	CSHEAR	3349	3301	3318	3317	3417	3418			
315-	CSHEAR	3350	3301	3418	3417	3467	3468			
316-	CSHEAR	3351	3301	3468	3467	3517	3518			
317-	CSHEAR	3352	3301	3518	3517	3567	3568			
318-	CSHEAR	3353	3301	3568	3567	3617	3618			
319-	CSHEAR	3354	3301	3114	3113	3213	3214			
320-	CSHEAR	3355	3301	3214	3213	3313	3314			
321-	CSHEAR	3356	3301	3314	3313	3413	3414			
322-	CSHEAR	3357	3301	3414	3413	3463	3464			
323-	CSHEAR	3358	3301	3464	3463	3513	3514			
324-	CSHEAR	3359	3301	3514	3513	3563	3564			
325-	CSHEAR	3360	3301	3564	3563	3613	3614			
326-	CSHEAR	3361	3301	3210	3209	3309	3310			
327-	CSHEAR	3362	3301	3310	3309	3409	3410			
328-	CSHEAR	3363	3301	3410	3409	3459	3460			
329-	CSHEAR	3364	3301	3460	3459	3509	3510			
330-	CSHEAR	3365	3301	3510	3509	3559	3560			
331-	CSHEAR	3366	3301	3560	3559	3609	3610			
332-	CSHEAR	3367	3301	3306	3305	3405	3406			
333-	CSHEAR	3368	3301	3406	3405	3455	3456			
334-	CSHEAR	3369	3301	3456	3455	3505	3506			
335-	CSHEAR	3370	3301	3506	3505	3555	3556			
336-	CSHEAR	3371	3301	3556	3555	3605	3606			
337-	CSHEAR	3372	3301	3402	3401	3451	3452			
338-	CSHEAR	3373	3301	3452	3451	3501	3502			
339-	CSHEAR	3374	3301	3502	3501	3551	3552			
340-	CSHEAR	3375	3301	3552	3551	3601	3602			
341-	CSHEAR	3376	3376	3622	3621	3671	3672			
342-	CSHEAR	3377	3376	3618	3617	3667	3668			
343-	CSHEAR	3378	3376	3614	3613	3663	3664			
344-	CSHEAR	3379	3376	3610	3609	3659	3660			
345-	CSHEAR	3380	3376	3602	3601	3651	3652			
346-	CTRMEM	3104	3104	3065	3113	3115	0.0			
347-	CTRMEM	3110	3104	3161	3209	3211	0.0			
348-	CTRMEM	3118	3104	3257	3305	3307	0.0			
349-	CTRMEM	3128	3104	3353	3401	3403	0.0			
350-	CTRMEM	3204	3104	3066	3114	3116	0.0			

PHASE 1: COMPUTER WING  
ORIGINAL WING

SERIALIZED CULK DATA ECHO

CARD

CARD	1	2	3	4	5	6	7	8	9	10
351-	CDMEM	3210	3104	3152	3210	3212	.0			
352-	CDMEM	3218	3104	3258	3308	3308	.0			
353-	CDMEM	3218	3104	3258	3407	3404	.0			
354-	DM1	CPAJC	0	2	4	2		183	1	
355-	DM1	CPAJC	1	121	1.0	1.0	1.0	1.0	1.0	8CPW1
356-	8CPW1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	8CPW2
357-	8CPW2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	8CPW3
358-	8CPW3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	8CPW4
359-	8CPW4	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	8CPW5
360-	8CPW5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	8CPW6
361-	8CPW6	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	8CPW7
362-	8CPW7	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	8CPW8
363-	8CPW8	1.0	1.0							
364-	DM1	FOR	0	2	1	2		6	18	
365-	DM1	EQR	1	3	1.0	-12.5	-129.0			
366-	DM1	FOR	2	3	1.0	-12.5	-129.0			
367-	DM1	FOR	3	3	1.0	-12.5	-135.0			
368-	DM1	FOR	4	3	1.0	-12.5	-135.0			
369-	DM1	FOR	5	3	1.0	-12.5	-141.75			
370-	DM1	FOR	6	3	1.0	-12.5	-141.75			
371-	DM1	EQR	7	3	1.0	4	-51.5	6	144.75	
372-	DM1	FOR	8	3	1.0	-12.5	-144.75			
373-	DM1	FOR	9	3	1.0	-12.5	-150.375			
374-	DM1	FOR	10	3	1.0	-12.5	-150.375			
375-	DM1	EQR	11	3	1.0	-12.5	-157.688			
376-	DM1	EQR	12	3	1.0	-12.5	-157.688			
377-	DM1	FOR	13	3	1.0	-12.5	-166.5			
378-	DM1	FOR	14	3	1.0	-12.5	-166.5			
379-	DM1	EQR	15	1	1.0	5	51.5	12.5		
380-	DM1	EQR	16	2	1.0	4	-51.5	6	170.75	
381-	DM1	EQR	17	3	1.0	-12.5	-170.75			
382-	DM1	EQR	18	2	1.0	4	-45.5	6	170.75	
383-	ETGR	2	INV	.1	100.	5	5		1.5	8ETG2
384-	8ETG2	MAX								
385-	GRDSET	0					0	456		
386-	GRID	3017		162.0	-61.58	51.5				
387-	GRID	3018		162.0	-61.58	49.0				
388-	GRID	3019		166.5	-61.58	51.5				
389-	GRID	3020		166.5	-61.58	49.0				
390-	GRID	3021		170.75	-61.58	51.5				
391-	GRID	3022		170.75	-61.58	49.0				
392-	GRID	3055		157.6875	-57.813451.5					
393-	GRID	3066		157.6875	-57.813448.7244					
394-	GRID	3113		153.375	-54.046751.5					
395-	GRID	3114		153.375	-54.046748.4487					
396-	GRID	3115		157.6875	-54.046751.5					
397-	GRID	3116	0	157.6875	-54.046748.4487	3000	456			
398-	GRID	3117		162.0	-54.046751.5					
399-	GRID	3118		162.0	-54.046748.4487					
400-	GRID	3119		166.5	-54.046751.5					

PHASE 1 ORBITER WING  
ORIGINAL WING

SORTED BULK DATA ECHO

CARD	1	2	3	4	5	6	7	8	9	10
COUNT	1	2	3	4	5	6	7	8	9	10
401- GRID	3120	0	166.5	-54.046748.4487	3000	456				
402- GRID	3121		170.75	-54.046751.5						
403- GRID	3122		170.75	-54.046748.4487						
404- GRID	3161		149.0625-50.280151.5							
405- GRID	3162		149.0625-50.280148.1731							
406- GRID	3209		144.75	-46.513451.5						
407- GRID	3210		144.75	-46.513447.8975						
408- GRID	3211		150.375	-46.513451.5						
409- GRID	3212		150.375	-46.513447.8975						
410- GRID	3213		153.375	-46.513451.5						
411- GRID	3214		153.375	-46.513447.8975						
412- GRID	3215		157.6875-46.513451.5							
413- GRID	3216		157.6875-46.513447.8975							
414- GRID	3217		162.0	-46.513451.5						
415- GRID	3218		162.0	-46.513447.8975						
416- GRID	3219		166.5	-46.513451.5						
417- GRID	3220		166.5	-46.513447.8975						
418- GRID	3221		170.75	-46.513451.5						
419- GRID	3222		170.75	-46.513447.8975						
420- GRID	3257		139.875	-42.255551.5						
421- GRID	3258		139.875	-42.255547.5859						
422- GRID	3305		135.0	-37.997551.5						
423- GRID	3306		135.0	-37.997547.2743						
424- GRID	3307		141.75	-37.997551.5						
425- GRID	3308	0	141.75	-37.997547.2743	3000	456				
426- GRID	3309		144.75	-37.997551.5						
427- GRID	3310		144.75	-37.997547.2743						
428- GRID	3311		150.375	-37.997551.5						
429- GRID	3312	0	150.375	-37.997547.2743	3000	456				
430- GRID	3313		153.375	-37.997551.5						
431- GRID	3314		153.375	-37.997547.2743						
432- GRID	3315		157.6875-37.997551.5							
433- GRID	3316	0	157.6875-37.997547.2743	3000	456					
434- GRID	3317		162.0	-37.997551.5						
435- GRID	3318		162.0	-37.997547.2743						
436- GRID	3319		166.5	-37.997551.5						
437- GRID	3320	0	166.5	-37.997547.2743	3000	456				
438- GRID	3321		170.75	-37.997551.5						
439- GRID	3322		170.75	-37.997547.2743						
440- GRID	3353		129.0	-32.757051.5						
441- GRID	3354		129.0	-32.757046.8909						
442- GRID	3401		125.5	-29.7	51.5					
443- GRID	3402		125.5	-29.7	46.6672					
444- GRID	3403		129.0	-29.7	51.5					
445- GRID	3404		129.0	-29.7	46.6672					
446- GRID	3405		135.0	-29.7	51.5					
447- GRID	3406		135.0	-29.7	46.6672					
448- GRID	3407		141.75	-29.7	51.5					
449- GRID	3408		141.75	-29.7	46.6672					
450- GRID	3409		144.75	-29.7	51.5					

PHASE 1XOREITER WING  
ORIGINAL WING

SORTED BULK DATA ECHO

CARD	COUNT	1	2	3	4	5	6	7	8	9	10
451- GRID	3410				144.75	-29.7	46.6572				
452- GRID	3411				150.375	-29.7	51.5				
453- GRID	3412				150.375	-29.7	46.6672				
454- GRID	3413				153.375	-29.7	51.5				
455- GRID	3414				153.375	-29.7	46.6672				
456- GRID	3415				157.6875	-29.7	51.5				
457- GRID	3416				157.6875	-29.7	46.6672				
458- GRID	3417				162.0	-29.7	51.5				
459- GRID	3418				162.0	-29.7	46.6672				
460- GRID	3419				166.5	-29.7	51.5				
461- GRID	3420				166.5	-29.7	46.6672				
462- GRID	3421				170.75	-29.7	51.5				
463- GRID	3422				170.75	-29.7	46.6672				
464- GRID	3451				125.5	-25.4	51.5				
465- GRID	3452				125.5	-25.4	46.3525				
466- GRID	3453				129.0	-25.4	51.5				
467- GRID	3454		0		129.0	-25.4	46.3525	3000	456		
468- GRID	3455				135.0	-25.4	51.5				
469- GRID	3456				135.0	-25.4	46.3525				
470- GRID	3457				141.75	-25.4	51.5				
471- GRID	3458		0		141.75	-25.4	46.3525	3000	456		
472- GRID	3459				144.75	-25.4	51.5				
473- GRID	3460				144.75	-25.4	46.3525				
474- GRID	3461				150.375	-25.4	51.5				
475- GRID	3462		0		150.375	-25.4	46.3525	3000	456		
476- GRID	3463				153.375	-25.4	51.5				
477- GRID	3464				153.375	-25.4	46.3525				
478- GRID	3465				157.6875	-25.4	51.5				
479- GRID	3466		0		157.6875	-25.4	46.3525	3000	456		
480- GRID	3467				162.0	-25.4	51.5				
481- GRID	3468				162.0	-25.4	46.3525				
482- GRID	3469				166.5	-25.4	51.5				
483- GRID	3470		0		166.5	-25.4	46.3525	3000	456		
484- GRID	3471				170.75	-25.4	51.5				
485- GRID	3472				170.75	-25.4	46.3525				
486- GRID	3501				125.5	-21.1	51.5				
487- GRID	3502				125.5	-21.1	46.0378				
488- GRID	3503				129.0	-21.1	51.5				
489- GRID	3504		0		129.0	-21.1	46.0378	3000	456		
490- GRID	3505				135.0	-21.1	51.5				
491- GRID	3506				135.0	-21.1	46.0378				
492- GRID	3507				141.75	-21.1	51.5				
493- GRID	3508		0		141.75	-21.1	46.0378	3000	456		
494- GRID	3509				144.75	-21.1	51.5				
495- GRID	3510				144.75	-21.1	46.0378				
496- GRID	3511				150.375	-21.1	51.5				
497- GRID	3512		0		150.375	-21.1	46.0378	3000	456		
498- GRID	3513				153.375	-21.1	51.5				
499- GRID	3514				153.375	-21.1	46.0378				
500- GRID	3515				157.6875	-21.1	51.5				

PHASE 1 ORBITER WING  
ORIGINAL WING

SORTED BULK DATA ECHO

CARD	COUNT	1	2	3	4	5	6	7	8	9	10
501- GRID	3516	0		157.6875	-21.1	46.0378	3000	456			
502- GRID	3517			162.0	-21.1	51.5					
503- GRID	3518			162.0	-21.1	46.0378					
504- GRID	3519			166.5	-21.1	51.5					
505- GRID	3520	0		166.5	-21.1	46.0378	3000	456			
506- GRID	3521			170.75	-21.1	51.5					
507- GRID	3522			170.75	-21.1	46.0378					
508- GRID	3524	0		165.25	-21.1	46.0378	3000	456			
509- GRID	3551			125.5	-17.425	51.5					
510- GRID	3552			125.5	-17.425	45.7689					
511- GRID	3553			129.0	-17.425	51.5					
512- GRID	3554	0		129.0	-17.425	45.7689	3000	456			
513- GRID	3555			135.0	-17.425	51.5					
514- GRID	3556			135.0	-17.425	45.7689					
515- GRID	3557			141.75	-17.425	51.5					
516- GRID	3558	0		141.75	-17.425	45.7689	3000	456			
517- GRID	3559			144.75	-17.425	51.5					
518- GRID	3560			144.75	-17.425	45.7689					
519- GRID	3561			150.375	-17.425	51.5					
520- GRID	3562	0		150.375	-17.425	45.7689	3000	456			
521- GRID	3563			153.375	-17.425	51.5					
522- GRID	3564			153.375	-17.425	45.7689					
523- GRID	3565			157.6875	-17.425	51.5					
524- GRID	3566	0		157.6875	-17.425	45.7689	3000	456			
525- GRID	3567			162.0	-17.425	51.5					
526- GRID	3568			162.0	-17.425	45.7689					
527- GRID	3569			166.5	-17.425	51.5					
528- GRID	3570	0		166.5	-17.425	45.7689	3000	456			
529- GRID	3571			170.75	-17.425	51.5					
530- GRID	3572			170.75	-17.425	45.7689					
531- GRID	3574	0		165.25	-17.425	45.7689	3000	456			
532- GRID	3601			125.5	-13.75	51.5					
533- GRID	3602			125.5	-13.75	45.5					
534- GRID	3603			129.0	-13.75	51.5					
535- GRID	3604			129.0	-13.75	45.5					
536- GRID	3605			135.0	-13.75	51.5					
537- GRID	3606			135.0	-13.75	45.5					
538- GRID	3607			141.75	-13.75	51.5					
539- GRID	3608			141.75	-13.75	45.5					
540- GRID	3609			144.75	-13.75	51.5					
541- GRID	3610			144.75	-13.75	45.5					
542- GRID	3611			150.375	-13.75	51.5					
543- GRID	3612			150.375	-13.75	45.5					
544- GRID	3613			153.375	-13.75	51.5					
545- GRID	3614			153.375	-13.75	45.5					
546- GRID	3615			157.6875	-13.75	51.5					
547- GRID	3616			157.6875	-13.75	45.5					
548- GRID	3617			162.0	-13.75	51.5					
549- GRID	3618			162.0	-13.75	45.5					
550- GRID	3619			166.5	-13.75	51.5					

PHASE 1XORBITER WING  
ORIGINAL WING

CARD		SORTED BULK DATA ECHO									
COUNT		1	2	3	4	5	6	7	8	9	10
551-	GRID	3620			166.5	-13.75	45.5				
552-	GRID	3621			170.75	-13.75	51.5				
553-	GRID	3622			170.75	-13.75	45.5				
554-	GRID	3623			165.617	-13.75	51.5				
555-	GRID	3624	0		165.25	-13.75	45.5	3002	456		
556-	GRID	3651			125.5	-12.5	51.5				
557-	GRID	3652			125.5	-12.5	45.5				
558-	GRID	3653			129.0	-12.5	51.5				
559-	GRID	3654			129.0	-12.5	45.5				
560-	GRID	3655			135.0	-12.5	51.5				
561-	GRID	3656			135.0	-12.5	45.5				
562-	GRID	3657			141.75	-12.5	51.5				
563-	GRID	3658			141.75	-12.5	45.5				
564-	GRID	3659			144.75	-12.5	51.5				
565-	GRID	3660			144.75	-12.5	45.5				
566-	GRID	3661			150.375	-12.5	51.5				
567-	GRID	3662			150.375	-12.5	45.5				
568-	GRID	3663			153.375	-12.5	51.5				
569-	GRID	3664			153.375	-12.5	45.5				
570-	GRID	3665			157.6875	-12.5	51.5				
571-	GRID	3666			157.6875	-12.5	45.5				
572-	GRID	3667			162.0	-12.5	51.5				
573-	GRID	3668			162.0	-12.5	45.5				
574-	GRID	3669			166.5	-12.5	51.5				
575-	GRID	3670			166.5	-12.5	45.5				
576-	GRID	3671			170.75	-12.5	51.5				
577-	GRID	3672			170.75	-12.5	45.5				
578-	MAT1	3030	10.566			.3	.1				
579-	MAT1	3031	10.566			.3	.0				
580-	MAT1	3100	10.566			.3	.1				
581-	MAT1	3400	10.566			.3	.0				
582-	MAT1	3500	10.566			.3	.0				
583-	MPC	3000	3115	3	8.625	3113	3	-4.3125		EMC3115	
584-	EMC3115		3117	3	-4.3125						
585-	MPC	3000	3116	3	8.625	3114	2	-0.31473		EMC3116A	
586-	EMC3116A		3114	3	-4.301	3118	2	-0.31473		EMC3116B	
587-	EMC3116B		3118	3	-4.301						
588-	MPC	3000	3119	3	8.75	3117	3	-4.25		EMC3119	
589-	EMC3119		3121	3	-4.5						
590-	MPC	3000	3120	3	8.75	3118	2	-0.31017		EMC3120A	
591-	EMC3120A		3118	3	-4.23867	3122	2	-0.32841		EMC3120B	
592-	EMC3120B		3122	3	-4.488						
593-	MPC	3000	3307	3	9.75	3305	3	-3.0		EMC3307	
594-	EMC3307		3309	3	-6.75						
595-	MPC	3000	3308	3	9.75	3306	2	-0.21894		EMC3308A	
596-	EMC3308A		3306	3	-2.992	3310	2	-0.49262		EMC3308B	
597-	EMC3308B		3310	3	-6.732						
598-	MPC	3000	3311	3	8.625	3309	3	-3.0		EMC3311	
599-	EMC3311		3313	3	-5.625						
600-	MPC	3000	3312	3	8.625	3310	2	-0.21894		EMC3312A	



PHASE I ORBITER WING  
ORIGINAL WING

SORTED BULK DATA ECHO

CARD	COUNT	1	2	3	4	5	6	7	8	9	10
601- EMC3312A				3310	3	-2.992	3314	2	-0.41052		EMC3312B
602- EMC3312B				3314	3	-5.61					
603- MPC	3000			3315	3	8.625	3313	3	-4.3125		EMC3315
604- EMC3315				3317	3	-4.3125					
605- MPC	3000			3316	3	8.625	3314	2	-0.31473		EMC3316A
606- EMC3316A				3314	3	-4.301	3318	2	-0.31473		EMC3316B
607- EMC3316B				3318	3	-4.301					
608- MPC	3000			3319	3	8.75	3317	3	-4.25		EMC3319
609- EMC3319				3321	3	-4.5					
610- MPC	3000			3320	3	8.75	3318	2	-0.31017		EMC3320A
611- EMC3320A				3318	3	-4.23867	3322	2	-0.32841		EMC3320B
612- EMC3320B				3322	3	-4.488					
613- MPC	3000			3453	3	9.5	3451	3	-6.0		EMC3453
614- EMC3453				3455	3	-3.5					
615- MPC	3000			3454	3	9.5	3452	2	-0.43788		EMC3454A
616- EMC3454A				3452	3	-5.984	3456	2	-0.25543		EMC3454B
617- EMC3454B				3456	3	-3.49067					
618- MPC	3000			3457	3	9.75	3455	3	-3.0		EMC3457
619- EMC3457				3459	3	-6.75					
620- MPC	3000			3458	3	9.75	3456	2	-0.21894		EMC3458A
621- EMC3458A				3456	3	-2.992	3460	2	-0.49262		EMC3458B
622- EMC3458B				3460	3	-6.732					
623- MPC	3000			3461	3	8.625	3459	3	-3.0		EMC3461
624- EMC3461				3463	3	-5.625					
625- MPC	3000			3462	3	8.625	3460	2	-0.21894		EMC3462A
626- EMC3462A				3460	3	-2.992	3464	2	-0.41052		EMC3462B
627- EMC3462B				3464	3	-5.61					
628- MPC	3000			3465	3	8.625	3463	3	-4.3125		EMC3465
629- EMC3465				3467	3	-4.3125					
630- MPC	3000			3466	3	8.625	3464	2	-0.31473		EMC3466A
631- EMC3466A				3464	3	-4.301	3468	2	-0.31473		EMC3466B
632- EMC3466B				3468	3	-4.301					
633- MPC	3000			3469	3	8.75	3467	3	-4.25		EMC3469
634- EMC3469				3471	3	-4.5					
635- MPC	3000			3470	3	8.75	3468	2	-0.31017		EMC3470A
636- EMC3470A				3468	3	-4.23867	3472	2	-0.32841		EMC3470B
637- EMC3470B				3472	3	-4.488					
638- MPC	3000			3503	3	9.5	3501	3	-6.0		EMC3503
639- EMC3503				3505	3	-3.5					
640- MPC	3000			3504	3	9.5	3502	2	-0.43788		EMC3504A
641- EMC3504A				3502	3	-5.984	3506	2	-0.25543		EMC3504B
642- EMC3504B				3506	3	-3.49067					
643- MPC	3000			3507	3	9.75	3505	3	-3.0		EMC3507
644- EMC3507				3509	3	-6.75					
645- MPC	3000			3508	3	9.75	3506	2	-0.21894		EMC3508A
646- EMC3508A				3506	3	-2.992	3510	2	-0.49262		EMC3508B
647- EMC3508B				3510	3	-6.732					
648- MPC	3000			3511	3	8.625	3509	3	-3.0		EMC3511
649- EMC3511				3513	3	-5.625					
650- MPC	3000			3512	3	8.625	3510	2	-0.21894		EMC3512A

PHASE 1A ORBITER WING  
ORIGINAL WING

SORTED BULK DATA ECHO

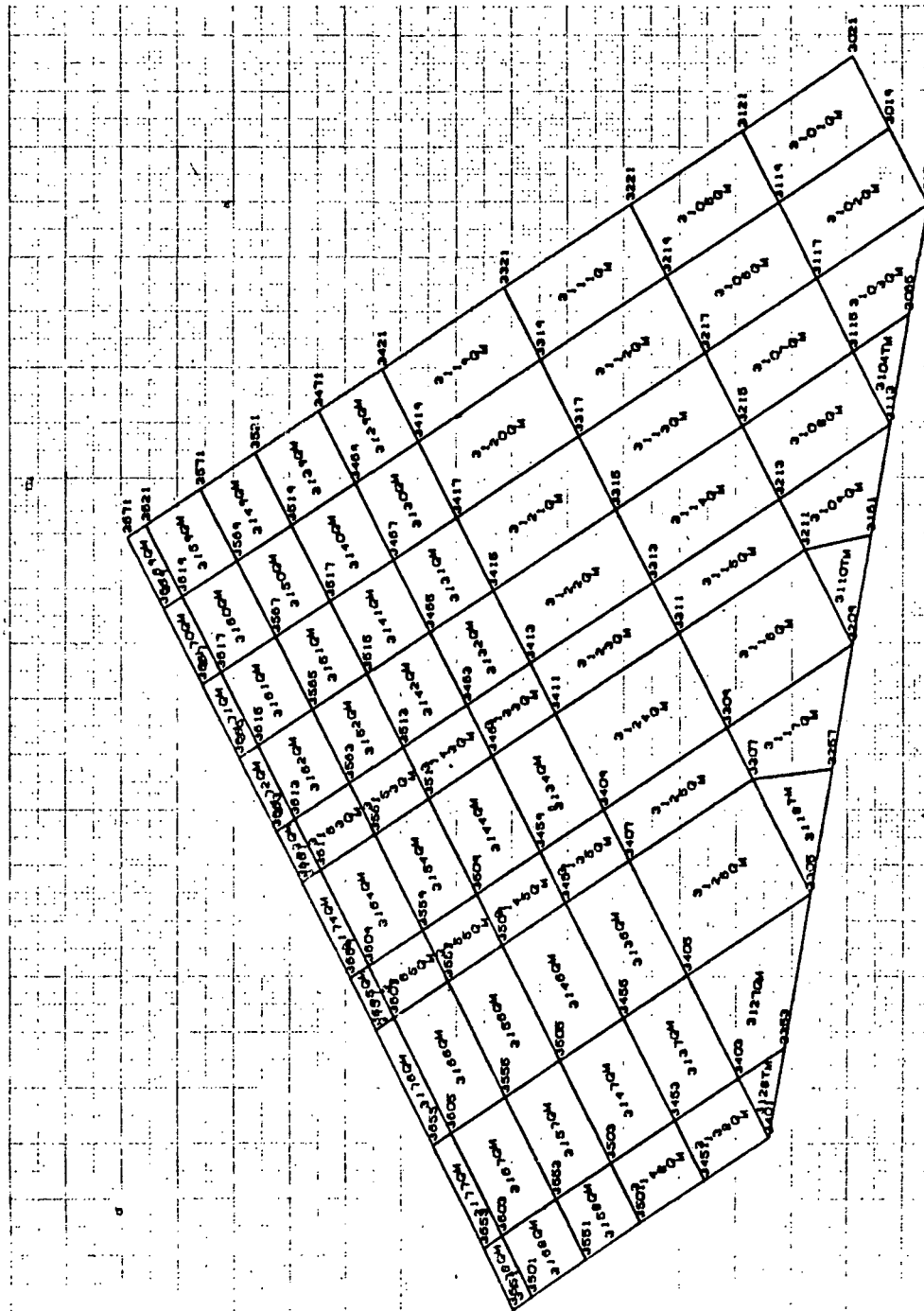
CARD	1	2	3	4	5	6	7	8	9	10
COUNT	1	2	3	4	5	6	7	8	9	10
651- EMC3512A			3510	3	-2.992	3514	2	-0.41052		EMC3512B
652- EMC3512B			3514	3	-5.61					
653- MPC	3000		3515	3	8.625	3513	3	-4.3125		EMC3515
654- EMC3515			3517	3	-4.3125					
655- MPC	3000		3516	3	8.625	3514	2	-0.31473		EMC3516A
656- EMC3516A			3514	3	-4.301	3518	2	-0.31473		EMC3516B
657- EMC3516B			3518	3	-4.301					
658- MPC	3000		3519	3	8.75	3517	3	-4.25		EMC3519
659- EMC3519			3521	3	-4.5					
660- MPC	3000		3520	3	8.75	3518	2	-0.31017		EMC3520A
661- EMC3520A			3518	3	-4.23857	3522	2	-0.32841		EMC3520B
662- EMC3520B			3522	3	-4.468					
663- MPC	3000		3524	3	8.75	3518	2	-0.40139		EMC3524A
664- EMC3524A			3518	3	-5.48533	3522	2	-0.23719		EMC3524B
665- EMC3524B			3522	3	-3.24133					
666- MPC	3000		3553	3	9.5	3551	3	-6.0		EMC3553
667- EMC3553			3555	3	-3.5					
668- MPC	3000		3554	3	9.5	3552	2	-0.43788		EMC3554A
669- EMC3554A			3552	3	-5.984	3556	2	-0.25543		EMC3554B
670- EMC3554B			3556	3	-3.49067					
671- MPC	3000		3557	3	9.75	3555	3	-3.0		EMC3557
672- EMC3557			3559	3	-6.75					
673- MPC	3000		3558	3	9.75	3556	2	-0.21894		EMC3558A
674- EMC3558A			3556	3	-2.992	3560	2	-0.49262		EMC3558B
675- EMC3558B			3560	3	-6.732					
676- MPC	3000		3561	3	8.625	3559	3	-3.0		EMC3561
677- EMC3561			3563	3	-5.625					
678- MPC	3000		3562	3	8.625	3560	2	-0.21894		EMC3562A
679- EMC3562A			3560	3	-2.992	3564	2	-0.41052		EMC3562B
680- EMC3562B			3564	3	-5.61					
681- MPC	3000		3565	3	8.625	3563	3	-4.3125		EMC3565
682- EMC3565			3567	3	-4.3125					
683- MPC	3000		3566	3	8.625	3564	2	-0.31473		EMC3566A
684- EMC3566A			3564	3	-4.301	3568	2	-0.31473		EMC3566B
685- EMC3566B			3568	3	-4.301					
686- MPC	3000		3569	3	8.75	3567	3	-4.25		EMC3569
687- EMC3569			3571	3	-4.5					
688- MPC	3000		3570	3	8.75	3568	2	-0.31017		EMC3570A
689- EMC3570A			3568	3	-4.23857	3572	2	-0.32841		EMC3570B
690- EMC3570B			3572	3	-4.488					
691- MPC	3000		3574	3	8.75	3568	2	-0.40139		EMC3574A
692- EMC3574A			3568	3	-5.48533	3572	2	-0.23719		EMC3574B
693- EMC3574B			3572	3	-3.24133					
694- MPC	3000		3623	2	4.5	3617	2	-0.883		EMC3623
695- EMC3623			3619	2	-3.617					
696- PARAM	GRDPNT	0								
697- PARAM	RNODE	1								
698- PARAM	TPCOPY	1								
699- PARAM	TPNAME	WINGP1								
700- PARAM	WTMASS	.002588								

PHASE 1XORBITER WING  
ORIGINAL WING

SORTED BULK DATA ECHO

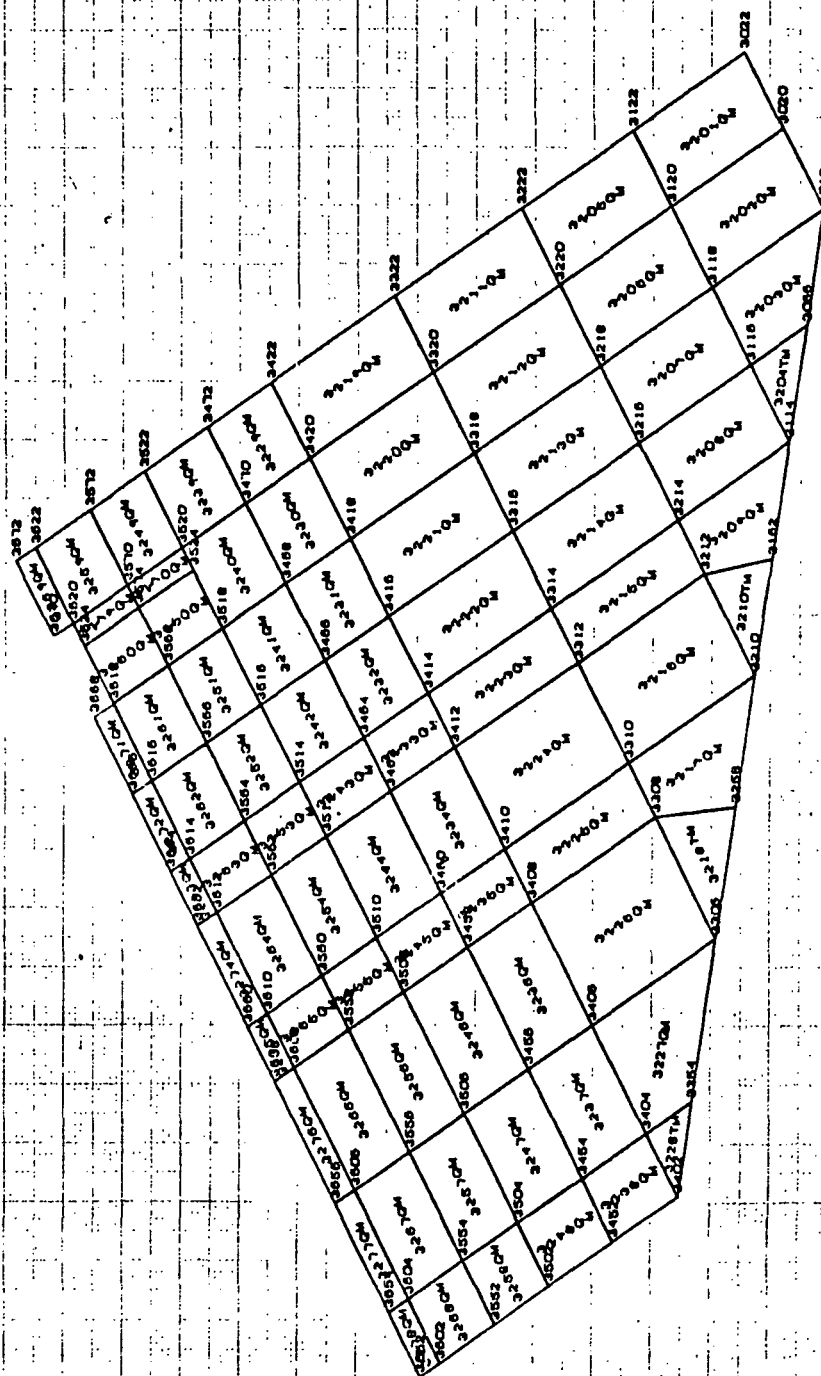
CARD	COUNT	1	2	3	4	5	6	7	8	9	10
701- PGDMEM2	3101	3100	.02	.0							
702- PROD	3401	3400	.031	.0	.0	.0016					
703- PROD	3405	3400	.034	.0	.0	.0016					
704- PROD	3411	3400	.037	.0	.0	.0016					
705- PROD	3419	3400	.040	.0	.0	.0016					
706- PROD	3429	3400	.043	.0	.0	.0016					
707- PROD	3441	3400	.044	.0	.0	.0016					
708- PROD	3453	3400	.046	.0	.0	.0016					
709- PROD	3465	3400	.047	.0	.0	.0016					
710- PROD	3477	3400	.029	.0	.0	.0016					
711- PROD	3481	3400	.030	.0	.0	.0016					
712- PROD	3483	3400	.032	.0	.0	.0016					
713- PROD	3485	3400	.033	.0	.0	.0016					
714- PROD	3487	3400	.034	.0	.0	.0016					
715- PROD	3489	3400	.036	.0	.0	.0016					
716- PROD	3491	3400	.038	.0	.0	.0016					
717- PROD	3493	3400	.040	.0	.0	.0016					
718- PROD	3495	3400	.041	.0	.0	.0016					
719- PROD	3497	3400	.048	.0	.0	.0016					
720- PROD	3519	3500	.10	.0	.0	.0					
721- PROD	3520	3500	.03	.0	.0	.0					
722- PROD	3527	3500	.25	.0	.0	.0					
723- PROD	3581	3500	.15	.0	.0	.0					
724- PROD	3583	3500	.07	.0	.0	.0					
725- PSHEAR	3301	3030	.032	.0135	3311	3030	.032	.0			
726- PSHEAR	3376	3030	.125	.0							
727- PTRMEM	3104	3100	.02	.0							
728- SUPORT	3653	3	3654	3	3655	3	3656	3			
729- SUPORT	3657	3	3658	3	3661	3	3662	3			
730- SUPORT	3659	23	3671	123	3672	2					
731- SUPORT	3665	3	3666	3	3669	3	3670	3			
ENDDATA											

**Appendix B8**  
**PLOTS OF MEMBER DATA**  
**PHASE 1 ANALYSIS: MODEL I WING**



ORIGINAL WING  
WING TOP COVER

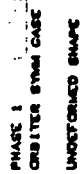
PHASE 1  
ORBITER SYMM CASE  
UNDEFORMED SHAPE

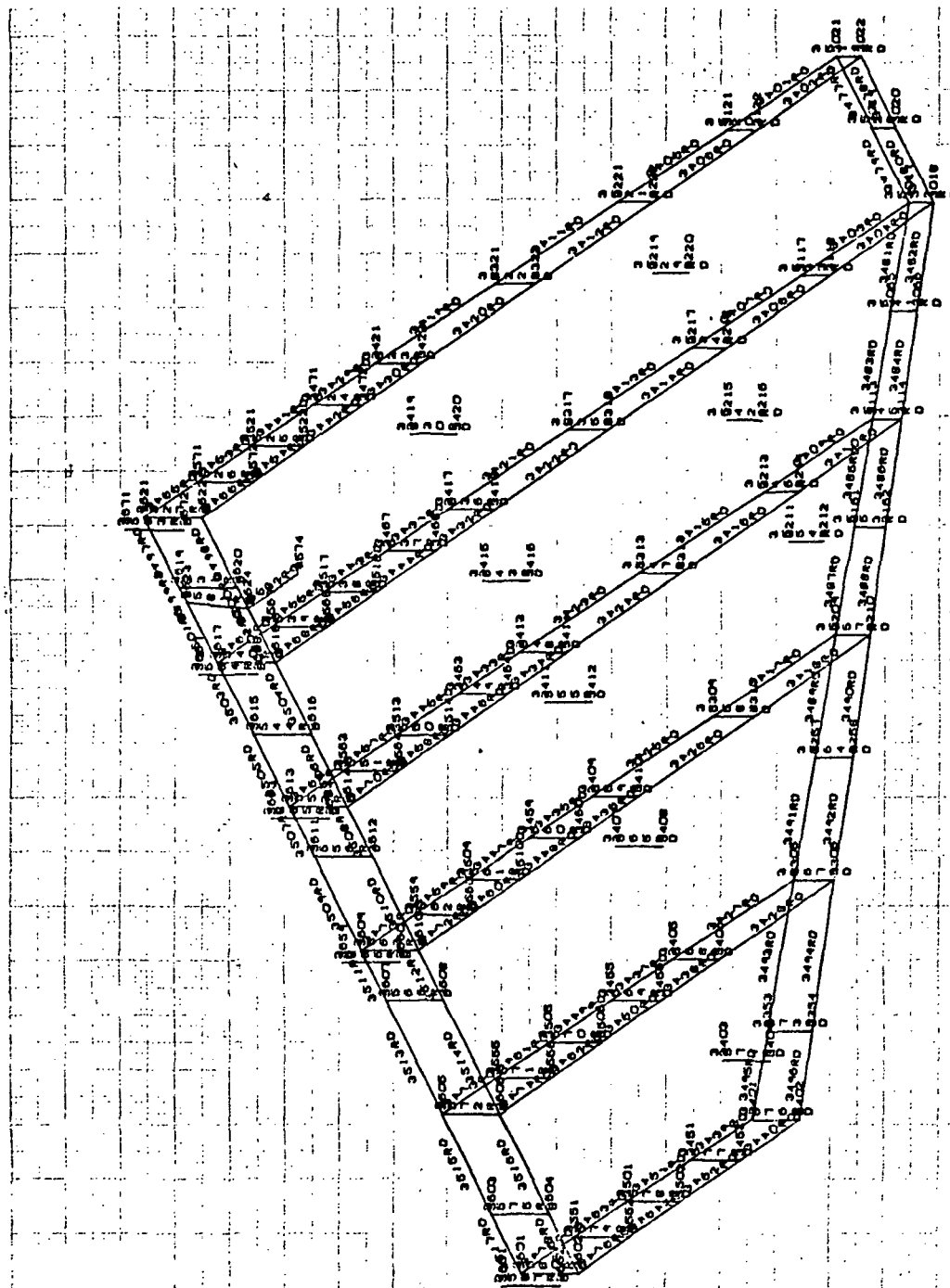


ORIGINAL WING  
WING BOTTOM COVER

PHASE I  
ORBITER SYN CASE

**UNIFORMED SHAPES**





ORIGINAL WING  
RIG + SPAR CAPS + VERT. STUDS

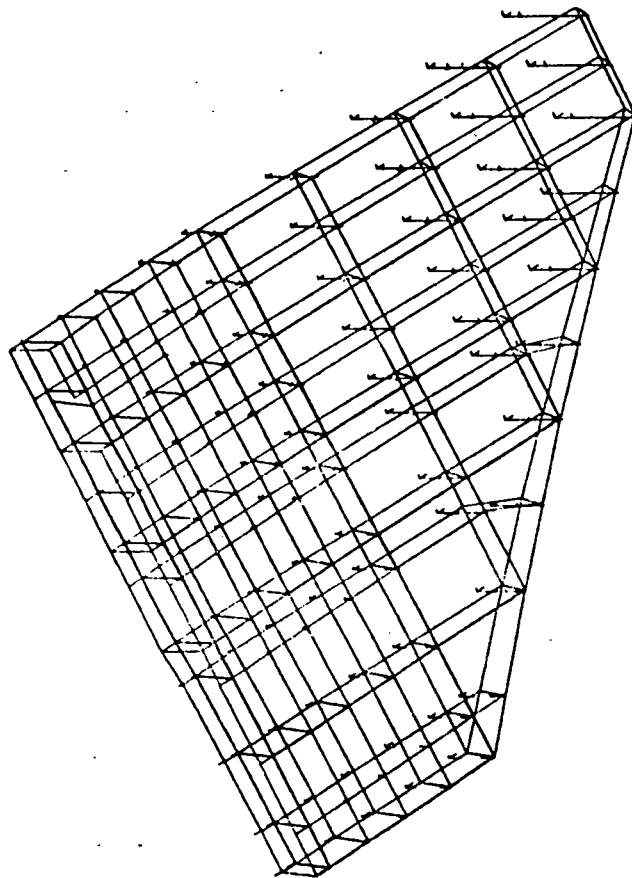
PHASE 1  
ORDITER SYM CASE

UNDEFORMED SHAPE

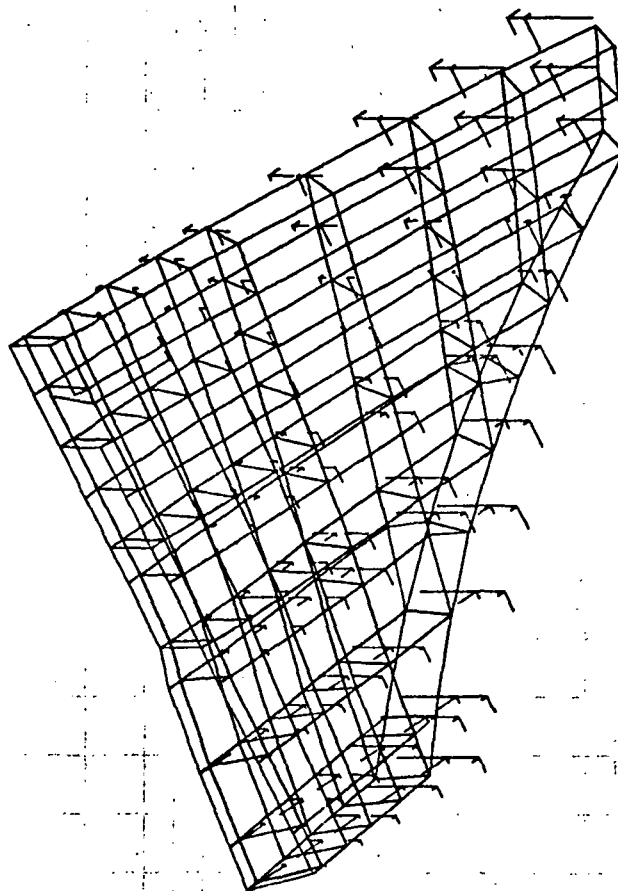


**Appendix B9**  
**PLOTS OF SYMMETRIC AND ANTISYMMETRIC MODES**  
**PHASE 1 ANALYSIS: MODEL I WING**

1 4/ 3/74 MAX-DEF. = 1.0000000

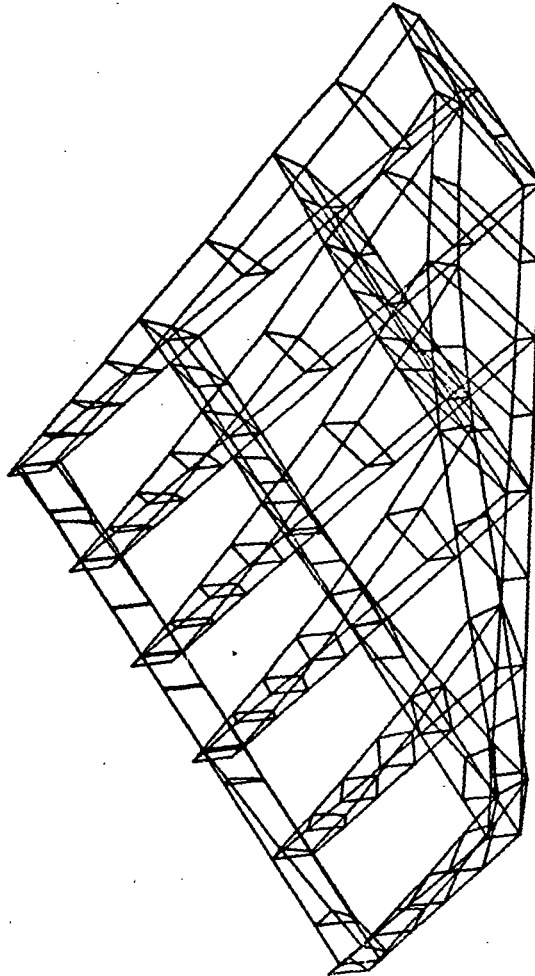


PHASE 1 (ORBITER WING)  
ORIGINAL WING  
FREE MODES FIXED AT INTERFACE  
MODAL DEFOR. SUBCASE 1 MODE 1 FREQ. 77.02113



PHASE 1 (ORBITER WING)  
ORIGINAL WING  
FREE MODES FIXED AT INTERFACE  
MODAL DEFOR. SUBCASE 2 MODE 2 FREQ. 168.2872

9/21/73 MAX-DEF. = 1.00000000



PHASE 1 (ORIGINAL)  
ORBITER WING (ORIGINAL)  
ORBITER WING FIXED AT INTERFACE  
FREE MODES FIXED AT INTERFACE  
MODAL DEFOR. SUBCASE 3 MODE 3 FREQ. 289.4000

**Appendix B10**  
**SORTED BULK DATA**  
**PHASE 1 ANALYSIS: MODEL I CARGO DOORS**

PHASE 1XORBITER DOORS.SYM CASE#  
ORIGINAL DOORS

CASE CONTROL DECK ECHO

CARD  
COUNT

1 TITLE # PHASE 1XORBITER DOORS.SYM CASE#  
2 SUBTITLE # ORIGINAL DOORS  
3 ECHO # BOTH  
4 MPC # 4000  
5 SPC # 4001  
6 METHOD # 1  
7 BEGIN BULK

PHASE 1XORBITER DOORS.SYM CASED  
ORIGINAL DOORS

SORTED BULK DATA ECHO

CARD	COUNT	1	2	3	4	5	6	7	8	9	10
1-	ASET1	3	4002	4172							
2-	ASET1	13	4029	4069	4119	4149					
3-	ASET1	23	4176	4004	4006	4008	4010	4178	4174	CAST1	
4-	CAST1	4180									
5-	BAROR		4381			.0	1.0	.0	1		
6-	CBAR	4381		4019	4029						
7-	CBAR	4382		4029	4049						
8-	CBAR	4383		4049	4069						
9-	CBAR	4384		4069	4079						
10-	CBAR	4385		4079	4099						
11-	CBAR	4386		4099	4119						
12-	CBAR	4387		4119	4129						
13-	CBAR	4388		4129	4149						
14-	CBAR	4389		4149	4169						
15-	CORD2R	4015	0	64.0	.0	62.5	64.0	-8.8389	71.3389	SCS4015	
16-	SCS4015	200.0	0.0	62.5							
17-	CQDMEM2	4101	4101	4011	4013	4023	4021	0.0			
18-	CQDMEM2	4102	4101	4013	4015	4025	4023	0.0			
19-	CQDMEM2	4103	4101	4015	4017	4027	4025	0.0			
20-	CQDMEM2	4104	4101	4017	4019	4029	4027	0.0			
21-	CQDMEM2	4105	4101	4031	4033	4043	4041	0.0			
22-	CQDMEM2	4106	4101	4033	4035	4045	4043	0.0			
23-	CQDMEM2	4107	4101	4035	4037	4047	4045	0.0			
24-	CQDMEM2	4108	4101	4037	4029	4049	4047	0.0			
25-	CQDMEM2	4117	4101	4081	4083	4093	4091	0.0			
26-	CQDMEM2	4118	4101	4083	4085	4095	4093	0.0			
27-	CQDMEM2	4119	4101	4085	4087	4097	4095	0.0			
28-	CQDMEM2	4120	4101	4087	4079	4099	4097	0.0			
29-	CQDMEM2	4129	4101	4131	4133	4143	4141	0.0			
30-	CQDMEM2	4130	4101	4133	4135	4145	4143	0.0			
31-	CQDMEM2	4131	4101	4135	4137	4147	4145	0.0			
32-	CQDMEM2	4132	4101	4137	4129	4149	4147	0.0			
33-	CQDMEM2	4133	4101	4151	4153	4163	4161	0.0			
34-	CQDMEM2	4134	4101	4153	4155	4165	4163	0.0			
35-	CQDMEM2	4135	4101	4155	4157	4167	4165	0.0			
36-	CQDMEM2	4136	4101	4157	4149	4169	4167	0.0			
37-	CQUAD2	4109	4109	4051	4053	4063	4061	0.0			
38-	CQUAD2	4110	4109	4053	4055	4065	4063	0.0			
39-	CQUAD2	4111	4109	4055	4057	4067	4065	0.0			
40-	CQUAD2	4112	4109	4057	4049	4069	4067	0.0			
41-	CQUAD2	4113	4109	4061	4063	4073	4071	0.0			
42-	CQUAD2	4114	4109	4063	4065	4075	4073	0.0			
43-	CQUAD2	4115	4109	4065	4067	4077	4075	0.0			
44-	CQUAD2	4116	4109	4067	4069	4079	4077	0.0			
45-	CQUAD2	4121	4109	4101	4103	4113	4111	0.0			
46-	CQUAD2	4122	4109	4103	4105	4115	4113	0.0			
47-	CQUAD2	4123	4109	4105	4107	4117	4115	0.0			
48-	CQUAD2	4124	4109	4107	4099	4119	4117	0.0			
49-	CQUAD2	4125	4109	4111	4113	4123	4121	0.0			
50-	CQUAD2	4126	4109	4113	4115	4125	4123	0.0			

PHASE 1XORBITER DOORS.SYM CASE#  
ORIGINAL DOORS

SORTED BULK DATA ECHO

CARD	COUNT	1	2	3	4	5	6	7	8	9	10
51-	CQUAD2	4127	4109	4115	4117	4127	4125	0.0			
52-	CQUAD2	4128	4109	4117	4119	4129	4127	0.0			
53-	CROD	4001	4001	4001	4003	4041	4001	4011	4013		
54-	CROD	4002	4001	4003	4005	4042	4001	4013	4015		
55-	CROD	4003	4001	4005	4007	4043	4001	4015	4017		
56-	CROD	4004	4001	4007	4009	4044	4001	4017	4019		
57-	CROD	4005	4001	4021	4023	4045	4001	4031	4033		
58-	CROD	4006	4001	4023	4025	4046	4001	4033	4035		
59-	CROD	4007	4001	4025	4027	4047	4001	4035	4037		
60-	CROD	4008	4001	4027	4029	4048	4001	4037	4029		
61-	CROD	4009	4001	4041	4043	4049	4001	4051	4053		
62-	CROD	4010	4001	4043	4045	4050	4001	4053	4055		
63-	CROD	4011	4001	4045	4047	4051	4001	4055	4057		
64-	CROD	4012	4001	4047	4049	4052	4001	4057	4049		
65-	CROD	4013	4001	4071	4073	4053	4001	4081	4083		
66-	CROD	4014	4001	4073	4075	4054	4001	4083	4085		
67-	CROD	4015	4001	4075	4077	4055	4001	4085	4087		
68-	CROD	4016	4001	4077	4079	4056	4001	4087	4079		
69-	CROD	4017	4001	4091	4093	4057	4001	4101	4103		
70-	CROD	4018	4001	4093	4095	4058	4001	4103	4105		
71-	CROD	4019	4001	4095	4097	4059	4001	4105	4107		
72-	CROD	4020	4001	4097	4099	4060	4001	4107	4099		
73-	CROD	4021	4001	4121	4123	4061	4001	4131	4133		
74-	CROD	4022	4001	4123	4125	4062	4001	4133	4135		
75-	CROD	4023	4001	4125	4127	4063	4001	4135	4137		
76-	CROD	4024	4001	4127	4129	4064	4001	4137	4129		
77-	CROD	4025	4001	4141	4143	4065	4001	4151	4153		
78-	CROD	4026	4001	4143	4145	4066	4001	4153	4155		
79-	CROD	4027	4001	4145	4147	4067	4001	4155	4157		
80-	CROD	4028	4001	4147	4149	4068	4001	4157	4149		
81-	CROD	4029	4001	4161	4163	4069	4001	4171	4173		
82-	CROD	4030	4001	4163	4165	4070	4001	4173	4175		
83-	CROD	4031	4001	4165	4167	4071	4001	4175	4177		
84-	CROD	4032	4001	4167	4169	4072	4001	4177	4179		
85-	CROD	4081	4081	4002	4004	4091	4081	4012	4014		
86-	CROD	4082	4081	4004	4006	4092	4081	4014	4016		
87-	CROD	4083	4081	4006	4008	4093	4081	4016	4018		
88-	CROD	4084	4081	4008	4010	4094	4081	4018	4020		
89-	CROD	4085	4081	4162	4164	4095	4081	4172	4174		
90-	CROD	4086	4081	4164	4166	4096	4081	4174	4176		
91-	CROD	4087	4081	4166	4168	4097	4081	4176	4178		
92-	CROD	4088	4081	4168	4170	4098	4081	4178	4180		
93-	CROD	4145	4145	4022	4024	4153	4145	4072	4074		
94-	CROD	4146	4145	4024	4026	4154	4145	4074	4076		
95-	CROD	4147	4145	4026	4028	4155	4145	4076	4078		
96-	CROD	4148	4145	4028	4030	4156	4145	4078	4080		
97-	CROD	4149	4145	4042	4044	4157	4145	4092	4094		
98-	CROD	4150	4145	4044	4046	4158	4145	4094	4096		
99-	CROD	4151	4145	4046	4048	4159	4145	4096	4098		
100-	CROD	4152	4145	4048	4050	4160	4145	4098	4100		



PHASE 1XORBITER DOORS.SYM CASE#  
ORIGINAL DOORS

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
101-	CROD	4161	4145	4122	4124	4165	4145	4142	4144	
102-	CROD	4162	4145	4124	4126	4166	4145	4144	4146	
103-	CROD	4163	4145	4126	4128	4167	4145	4146	4148	
104-	CROD	4164	4145	4128	4130	4168	4145	4148	4150	
105-	CROD	4301	4301	4001	4002	4341	4301	4011	4012	
106-	CROD	4302	4302	4003	4004	4342	4302	4013	4014	
107-	CROD	4303	4302	4005	4006	4343	4302	4015	4016	
108-	CROD	4304	4302	4007	4008	4344	4302	4017	4018	
109-	CROD	4305	4301	4009	4010	4345	4301	4019	4020	
110-	CROD	4306	4301	4021	4022	4346	4301	4031	4022	
111-	CROD	4307	4302	4023	4024	4347	4302	4033	4024	
112-	CROD	4308	4302	4025	4026	4348	4302	4035	4026	
113-	CROD	4309	4302	4027	4028	4349	4302	4037	4028	
114-	CROD	4310	4302	4029	4030					
115-	CROD	4311	4301	4041	4042	4350	4301	4051	4042	
116-	CROD	4312	4302	4043	4044	4351	4302	4053	4044	
117-	CROD	4313	4302	4045	4046	4352	4302	4055	4046	
118-	CROD	4314	4302	4047	4048	4353	4302	4057	4048	
119-	CROD	4315	4302	4049	4050					
120-	CROD	4316	4301	4071	4072	4354	4301	4081	4072	
121-	CROD	4317	4302	4073	4074	4355	4302	4083	4074	
122-	CROD	4318	4302	4075	4076	4356	4302	4085	4076	
123-	CROD	4319	4302	4077	4078	4357	4302	4087	4078	
124-	CROD	4320	4302	4079	4080					
125-	CROD	4321	4301	4091	4092	4358	4301	4101	4092	
126-	CROD	4322	4302	4093	4094	4359	4302	4103	4094	
127-	CROD	4323	4302	4095	4096	4360	4302	4105	4096	
128-	CROD	4324	4302	4097	4098	4361	4302	4107	4098	
129-	CROD	4325	4302	4099	4100					
130-	CROD	4326	4301	4121	4122	4362	4301	4131	4122	
131-	CROD	4327	4302	4123	4124	4363	4302	4133	4124	
132-	CROD	4328	4302	4125	4126	4364	4302	4135	4126	
133-	CROD	4329	4302	4127	4128	4365	4302	4137	4128	
134-	CROD	4330	4302	4129	4130					
135-	CROD	4331	4301	4141	4142	4366	4301	4151	4142	
136-	CROD	4332	4302	4143	4144	4367	4302	4153	4144	
137-	CROD	4333	4302	4145	4146	4368	4302	4155	4146	
138-	CROD	4334	4302	4147	4148	4369	4302	4157	4148	
139-	CROD	4335	4302	4149	4150					
140-	CROD	4336	4301	4161	4162	4370	4301	4171	4172	
141-	CROD	4337	4302	4163	4164	4371	4302	4173	4174	
142-	CROD	4338	4302	4165	4166	4372	4302	4175	4176	
143-	CROD	4339	4302	4167	4168	4373	4302	4177	4178	
144-	CROD	4340	4301	4169	4170	4374	4301	4179	4180	
145-	CSHEAR	4201	4201	4001	4003	4004	4002			
146-	CSHEAR	4202	4201	4003	4005	4006	4004			
147-	CSHEAR	4203	4201	4005	4007	4008	4006			
148-	CSHEAR	4204	4201	4007	4009	4010	4008			
149-	CSHEAR	4205	4201	4021	4023	4024	4022			
150-	CSHEAR	4206	4201	4023	4025	4026	4024			

PHASE 1XORBITER DOORS.SYM CASE#  
ORIGINAL DOORS

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
151-	CSHEAR	4207	4201	4025	4027	4028	4026			
152-	CSHEAR	4208	4201	4027	4029	4030	4028			
153-	CSHEAR	4209	4201	4041	4043	4044	4042			
154-	CSHEAR	4210	4201	4043	4045	4046	4044			
155-	CSHEAR	4211	4201	4045	4047	4048	4046			
156-	CSHEAR	4212	4201	4047	4049	4050	4048			
157-	CSHEAR	4213	4201	4071	4073	4074	4072			
158-	CSHEAR	4214	4201	4073	4075	4076	4074			
159-	CSHEAR	4215	4201	4075	4077	4078	4076			
160-	CSHEAR	4216	4201	4077	4079	4080	4078			
161-	CSHEAR	4217	4201	4091	4093	4094	4092			
162-	CSHEAR	4218	4201	4093	4095	4096	4094			
163-	CSHEAR	4219	4201	4095	4097	4098	4096			
164-	CSHEAR	4220	4201	4097	4099	4100	4098			
165-	CSHEAR	4221	4201	4121	4123	4124	4122			
166-	CSHEAR	4222	4201	4123	4125	4126	4124			
167-	CSHEAR	4223	4201	4125	4127	4128	4126			
168-	CSHEAR	4224	4201	4127	4129	4130	4128			
169-	CSHEAR	4225	4201	4141	4143	4144	4142			
170-	CSHEAR	4226	4201	4143	4145	4146	4144			
171-	CSHEAR	4227	4201	4145	4147	4148	4146			
172-	CSHEAR	4228	4201	4147	4149	4150	4148			
173-	CSHEAR	4229	4201	4161	4163	4164	4162			
174-	CSHEAR	4230	4201	4163	4165	4166	4164			
175-	CSHEAR	4231	4201	4165	4167	4168	4166			
176-	CSHEAR	4232	4201	4167	4169	4170	4168			
177-	CSHEAR	4241	4201	4011	4013	4014	4012			
178-	CSHEAR	4242	4201	4013	4015	4016	4014			
179-	CSHEAR	4243	4201	4015	4017	4018	4016			
180-	CSHEAR	4244	4201	4017	4019	4020	4018			
181-	CSHEAR	4245	4201	4031	4033	4024	4022			
182-	CSHEAR	4246	4201	4033	4035	4026	4024			
183-	CSHEAR	4247	4201	4035	4037	4028	4026			
184-	CSHEAR	4248	4201	4037	4029	4030	4028			
185-	CSHEAR	4249	4201	4051	4053	4044	4042			
186-	CSHEAR	4250	4201	4053	4055	4046	4044			
187-	CSHEAR	4251	4201	4055	4057	4048	4046			
188-	CSHEAR	4252	4201	4057	4049	4050	4048			
189-	CSHEAR	4253	4201	4081	4083	4074	4072			
190-	CSHEAR	4254	4201	4083	4085	4076	4074			
191-	CSHEAR	4255	4201	4085	4087	4078	4076			
192-	CSHEAR	4256	4201	4087	4079	4080	4078			
193-	CSHEAR	4257	4201	4101	4103	4094	4092			
194-	CSHEAR	4258	4201	4103	4105	4096	4094			
195-	CSHEAR	4259	4201	4105	4107	4098	4096			
196-	CSHEAR	4260	4201	4107	4099	4100	4098			
197-	CSHEAR	4261	4201	4131	4133	4124	4122			
198-	CSHEAR	4262	4201	4133	4135	4126	4124			
199-	CSHEAR	4263	4201	4135	4137	4128	4126			
200-	CSHEAR	4264	4201	4137	4129	4130	4128			

PHASE 1XORBITER DOORS.SYM CASE#  
ORIGINAL DOORS

SORTED BULK DATA ECHO

CARD

COUNT	1	2	3	4	5	6	7	8	9	10
201-	CSHEAR	4265	4201	4151	4153	4144	4142			
202-	CSHEAR	4266	4201	4153	4155	4146	4144			
203-	CSHEAR	4267	4201	4155	4157	4148	4146			
204-	CSHEAR	4268	4201	4157	4149	4150	4148			
205-	CSHEAR	4269	4201	4171	4173	4174	4172			
206-	CSHEAR	4270	4201	4173	4175	4176	4174			
207-	CSHEAR	4271	4201	4175	4177	4178	4176			
208-	CSHEAR	4272	4201	4177	4179	4180	4178			
209-	DMI	CPAJC	0	2	1	2		1	1	
210-	DMI	CPAJC	1	1	1.0					
211-	DMI	EQR	0	2	1	2		3	3	
212-	DMI	EQR	1	2	1.0	3	-64.0			
213-	DMI	EQR	2	1	1.0	3	62.5			
214-	DMI	EQR	3	2	1.0	3	-166.5			
215-	EIGR	1	GIV				8		1.0-4	6EIG1
216-	6EIG1	MAX								
217-	GRID	4001	0	64.0	.0	75.0	0	456		
218-	GRID	4002	0	64.0	.0	73.0	0	1456		
219-	GRID	4003	0	64.0	-4.7835	74.0485	0	456		
220-	GRID	4004	0	64.0	-4.0181	72.2007	0	1456		
221-	GRID	4005	0	64.0	-8.8389	71.3389	4015	456		
222-	GRID	4006	0	64.0	-7.4247	69.9247	0	1456		
223-	GRID	4007	0	64.0	-11.5485	67.2835	0	456		
224-	GRID	4008	0	64.0	-9.7007	66.5181	0	1456		
225-	GRID	4009	0	64.0	-12.5	62.5	0	456		
226-	GRID	4010	0	64.0	-10.5	62.5	0	1456		
227-	GRID	4011	0	64.0	.0	75.0	0	456		
228-	GRID	4012	0	64.0	.0	73.0	0	1456		
229-	GRID	4013	0	64.0	-4.7835	74.0485	0	456		
230-	GRID	4014	0	64.0	-4.0181	72.2007	0	1456		
231-	GRID	4015	0	64.0	-8.8389	71.3389	4015	456		
232-	GRID	4016	0	64.0	-7.4247	69.9247	0	1456		
233-	GRID	4017	0	64.0	-11.5485	67.2835	0	456		
234-	GRID	4018	0	64.0	-9.7007	66.5181	0	1456		
235-	GRID	4019	0	64.0	-12.5	62.5	0	4		
236-	GRID	4020	0	64.0	-10.5	62.5	0	1456		
237-	GRID	4021	0	78.0	.0	75.0	0	456		
238-	GRID	4022	0	78.0	.0	73.0	0	1456		
239-	GRID	4023	0	78.0	-4.7835	74.0485	0	456		
240-	GRID	4024	0	78.0	-4.0181	72.2007	0	1456		
241-	GRID	4025	0	78.0	-8.8389	71.3389	0	456		
242-	GRID	4026	0	78.0	-7.4247	69.9247	0	1456		
243-	GRID	4027	0	78.0	-11.5485	67.2835	0	456		
244-	GRID	4028	0	78.0	-9.7007	66.5181	0	1456		
245-	GRID	4029	0	78.0	-12.5	62.5	0	4		
246-	GRID	4030	0	78.0	-10.5	62.5	0	1456		
247-	GRID	4031	0	78.0	.0	75.0	0	456		
248-	GRID	4033	0	78.0	-4.7835	74.0485	0	456		
249-	GRID	4035	0	78.0	-8.8389	71.3389	0	456		
250-	GRID	4037	0	78.0	-11.5485	67.2835	0	456		

PHASE 1XORBITER DOORS.SYM CASED  
ORIGINAL DOORS

SORTED BULK DATA ECHO

CARD	COUNT	1	2	3	4	5	6	7	8	9	10
251-	GRID	4041	0	93.28	.0	75.0	0	456			
252-	GRID	4042	0	93.28	.0	73.0	0	1456			
253-	GRID	4043	0	93.28	-4.7835	74.0485	0	456			
254-	GRID	4044	0	93.28	-4.0181	72.2007	0	1456			
255-	GRID	4045	0	93.28	-8.8389	71.3389	0	456			
256-	GRID	4046	0	93.28	-7.4247	69.9247	0	1456			
257-	GRID	4047	0	93.28	-11.548567.2835	0	456				
258-	GRID	4048	0	93.28	-9.7007	66.5181	0	1456			
259-	GRID	4049	0	93.28	-12.5	62.5	0				
260-	GRID	4050	0	93.28	-10.5	62.5	0	1456			
261-	GRID	4051	0	93.28	.0	75.0	0				
262-	GRID	4053	0	93.28	-4.7835	74.0485	0				
263-	GRID	4055	0	93.28	-8.8389	71.3389	0				
264-	GRID	4057	0	93.28	-11.548567.2835	0					
265-	GRID	4061	0	102.12	.0	75.0	0				
266-	GRID	4063	0	102.12	-4.7835	74.0485	0				
267-	GRID	4065	0	102.12	-8.8389	71.3389	0				
268-	GRID	4067	0	102.12	-11.548567.2835	0					
269-	GRID	4069	0	102.12	-12.5	62.5	0				
270-	GRID	4071	0	107.92	.0	75.0	0				
271-	GRID	4072	0	107.92	.0	73.0	0	1456			
272-	GRID	4073	0	107.92	-4.7835	74.0485	0				
273-	GRID	4074	0	107.92	-4.0181	72.2007	0	1456			
274-	GRID	4075	0	107.92	-8.8389	71.3389	0				
275-	GRID	4076	0	107.92	-7.4247	69.9247	0	1456			
276-	GRID	4077	0	107.92	-11.548567.2835	0					
277-	GRID	4078	0	107.92	-9.7007	66.5181	0	1456			
278-	GRID	4079	0	107.92	-12.5	62.5	0				
279-	GRID	4080	0	107.92	-10.5	62.5	0	1456			
280-	GRID	4081	0	107.92	.0	75.0	0	456			
281-	GRID	4083	0	107.92	-4.7835	74.0485	0	456			
282-	GRID	4085	0	107.92	-8.8389	71.3389	0	456			
283-	GRID	4087	0	107.92	-11.548567.2835	0	456				
284-	GRID	4091	0	122.56	.0	75.0	0	456			
285-	GRID	4092	0	122.56	.0	73.0	0	1456			
286-	GRID	4093	0	122.56	-4.7835	74.0485	0	456			
287-	GRID	4094	0	122.56	-4.0181	72.2007	0	1456			
288-	GRID	4095	0	122.56	-8.8389	71.3389	0	456			
289-	GRID	4096	0	122.56	-7.4247	69.9247	0	1456			
290-	GRID	4097	0	122.56	-11.548567.2835	0	456				
291-	GRID	4098	0	122.56	-9.7007	66.5181	0	1456			
292-	GRID	4099	0	122.56	-12.5	62.5	0				
293-	GRID	4100	0	122.56	-10.5	62.5	0	1456			
294-	GRID	4101	0	122.56	.0	75.0	0				
295-	GRID	4103	0	122.56	-4.7835	74.0485	0				
296-	GRID	4105	0	122.56	-8.8389	71.3389	0				
297-	GRID	4107	0	122.56	-11.548567.2835	0					
298-	GRID	4111	0	129.0	.0	75.0	0				
299-	GRID	4113	0	129.0	-4.7835	74.0485	0				
300-	GRID	4115	0	129.0	-8.8389	71.3389	0				

PHASE 1XORBITER DOORS.SYM CASED  
ORIGINAL DOORS

SORTED BULK DATA ECHO

CARD

COUNT	1	2	3	4	5	6	7	8	9	10
301-	GRID	4117	0	129.0	-11.548567.2835	0				
302-	GRID	4119	0	129.0	-12.5	62.5	0			
303-	GRID	4121	0	137.2	.0	75.0	0			
304-	GRID	4122	0	137.2	.0	73.0	0	1456		
305-	GRID	4123	0	137.2	-4.7835	74.0485	0			
306-	GRID	4124	0	137.2	-4.0181	72.2007	0	1456		
307-	GRID	4125	0	137.2	-8.8389	71.3389	0			
308-	GRID	4126	0	137.2	-7.4247	69.9247	0	1456		
309-	GRID	4127	0	137.2	-11.548567.2835	0				
310-	GRID	4128	0	137.2	-9.7007	66.5181	0	1456		
311-	GRID	4129	0	137.2	-12.5	62.5	0			
312-	GRID	4130	0	137.2	-10.5	62.5	0	1456		
313-	GRID	4131	0	137.2	.0	75.0	0	456		
314-	GRID	4133	0	137.2	-4.7835	74.0485	0	456		
315-	GRID	4135	0	137.2	-8.8389	71.3389	0	456		
316-	GRID	4137	0	137.2	-11.548567.2835	0		456		
317-	GRID	4141	0	153.375	.0	75.0	0	456		
318-	GRID	4142	0	153.375	.0	73.0	0	1456		
319-	GRID	4143	0	153.375	-4.7835	74.0485	0	456		
320-	GRID	4144	0	153.375	-4.0181	72.2007	0	1456		
321-	GRID	4145	0	153.375	-8.8389	71.3389	0	456		
322-	GRID	4146	0	153.375	-7.4247	69.9247	0	1456		
323-	GRID	4147	0	153.375	-11.548567.2835	0		456		
324-	GRID	4148	0	153.375	-9.7007	66.5181	0	1456		
325-	GRID	4149	0	153.375	-12.5	62.5	0	4		
326-	GRID	4150	0	153.375	-10.5	62.5	0	1456		
327-	GRID	4151	0	153.375	.0	75.0	0	456		
328-	GRID	4153	0	153.375	-4.7835	74.0485	0	456		
329-	GRID	4155	0	153.375	-8.8389	71.3389	0	456		
330-	GRID	4157	0	153.375	-11.548567.2835	0		456		
331-	GRID	4161	0	166.5	.0	75.0	0	456		
332-	GRID	4162	0	166.5	.0	73.0	0	1456		
333-	GRID	4163	0	166.5	-4.7835	74.0485	0	456		
334-	GRID	4164	0	166.5	-4.0181	72.2007	0	1456		
335-	GRID	4165	0	166.5	-8.8389	71.3389	4015	456		
336-	GRID	4166	0	166.5	-7.4247	69.9247	0	1456		
337-	GRID	4167	0	166.5	-11.548567.2835	0		456		
338-	GRID	4168	0	166.5	-9.7007	66.5181	0	1456		
339-	GRID	4169	0	166.5	-12.5	62.5	0	4		
340-	GRID	4170	0	166.5	-10.5	62.5	0	1456		
341-	GRID	4171	0	166.5	.0	75.0	0	456		
342-	GRID	4172	0	166.5	.0	73.0	0	1456		
343-	GRID	4173	0	166.5	-4.7835	74.0485	0	456		
344-	GRID	4174	0	166.5	-4.0181	72.2007	0	1456		
345-	GRID	4175	0	166.5	-8.8389	71.3389	4015	456		
346-	GRID	4176	0	166.5	-7.4247	69.9247	0	1456		
347-	GRID	4177	0	166.5	-11.548567.2835	0		456		
348-	GRID	4178	0	166.5	-9.7007	66.5181	0	1456		
349-	GRID	4179	0	166.5	-12.5	62.5	0	456		
350-	GRID	4180	0	166.5	-10.5	62.5	0	1456		

PHASE 1XORBITER DOORS.SYM CASE#  
ORIGINAL DOORS

SORTED BULK DATA ECHO

CARD	COUNT	1	2	3	4	5	6	7	8	9	10
351-	MAT1	4100	10.566			.3	.1				
352-	MAT1	4200	10.566			.3	.0				
353-	MPC	4000	4011	1	1.0	4001	1	-1.0			
354-	MPC	4000	4011	2	1.0	4001	2	-1.0			
355-	MPC	4000	4013	1	1.0	4003	1	-1.0			
356-	MPC	4000	4015	1	1.0	4005	1	-1.0			
357-	MPC	4000	4015	2	1.0	4005	2	-1.0			
358-	MPC	4000	4017	1	1.0	4007	1	-1.0			
359-	MPC	4000	4019	1	1.0	4009	1	-1.0			
360-	MPC	4000	4019	3	1.0	4009	3	-1.0			
361-	MPC	4000	4161	1	1.0	4171	1	-1.0			
362-	MPC	4000	4161	2	1.0	4171	2	-1.0			
363-	MPC	4000	4163	1	1.0	4173	1	-1.0			
364-	MPC	4000	4165	1	1.0	4175	1	-1.0			
365-	MPC	4000	4165	2	1.0	4175	2	-1.0			
366-	MPC	4000	4167	1	1.0	4177	1	-1.0			
367-	MPC	4000	4169	1	1.0	4179	1	-1.0			
368-	MPC	4000	4169	3	1.0	4179	3	-1.0			
369-	PARAM	GRDPNT	0								
370-	PARAM	TPCOPY	1								
371-	PARAM	TPNAME	DOORSP1								
372-	PARAM	WTMASS	.002588								
373-	PBAR	4381	4100	.056	.006	.003		.0			
374-	PQDMEM2	4101	4100	.016	.0						
375-	PQUAD2	4109	4100	.016	.0						
376-	PROD	4001	4200	.034	.0	.0	.0088				
377-	PROD	4081	4200	.011	.0	.0	.0				
378-	PROD	4145	4200	.022	.0	.0	.0				
379-	PROD	4301	4200	.016	.0	.0	.0				
380-	PROD	4302	4200	.032	.0	.0	.0				
381-	PSHEAR	4201	4200	.032	.0						
382-	SPC	4001	4001	2		4012	2				
383-	SPC	4001	4002	2		4172	2				
384-	SPC	4001	4021	2		4031	2				
385-	SPC	4001	4022	2		4042	2				
386-	SPC	4001	4041	2		4051	246				
387-	SPC	4001	4061	246		4111	246				
388-	SPC	4001	4071	246		4081	2				
389-	SPC	4001	4072	2		4092	2				
390-	SPC	4001	4091	2		4101	246				
391-	SPC	4001	4121	246		4131	2				
392-	SPC	4001	4122	2		4142	2				
393-	SPC	4001	4141	2		4151	2				
394-	SPC	4001	4171	2		4162	2				
395-	SPC	4002	4001	1		4001	3				
396-	SPC	4002	4002	3		4172	3				
397-	SPC	4002	4011	3		4012	3				
398-	SPC	4002	4021	1		4021	3				
399-	SPC	4002	4022	3		4042	3				
400-	SPC	4002	4031	1		4031	3				

PHASE 1XORBITER DOORS.SYM CASE#  
ORIGINAL DOORS

SORTED BULK DATA ECHO

CARD

COUNT	1	2	3	4	5	6	7	8	9	10
401- SPC	4002	4041	1			4041	3			
402- SPC	4002	4051	1			4051	35			
403- SPC	4002	4061	1			4061	35			
404- SPC	4002	4071	1			4071	35			
405- SPC	4002	4072	3			4092	3			
406- SPC	4002	4081	1			4081	3			
407- SPC	4002	4091	1			4091	3			
408- SPC	4002	4101	1			4101	35			
409- SPC	4002	4111	1			4111	35			
410- SPC	4002	4121	1			4121	35			
411- SPC	4002	4122	3			4142	3			
412- SPC	4002	4131	1			4131	3			
413- SPC	4002	4141	1			4141	3			
414- SPC	4002	4151	1			4151	3			
415- SPC	4002	4161	3			4162	3			
416- SPC	4002	4171	1			4171	3			
417- SUPORT	4010	3	4069	1		4180	3			
ENDDATA										

PHASE 1(ORBITER DOORS,ANTI CASE)  
ORIGINAL DOORS

CARD COUNT	CASE CONTROL DECK ECHO
1	TITLE = PHASE 1(ORBITER DOORS,ANTI CASE)
2	SUBTITLE = ORIGINAL DOORS
3	ECHO = BOTH
4	MPC = 4000
5	SPC = 4092
6	METHOD = 1
7	BEGIN BULK



PHASE 1(ORBITER DOORS,ANTI CASE)  
ORIGINAL DOORS

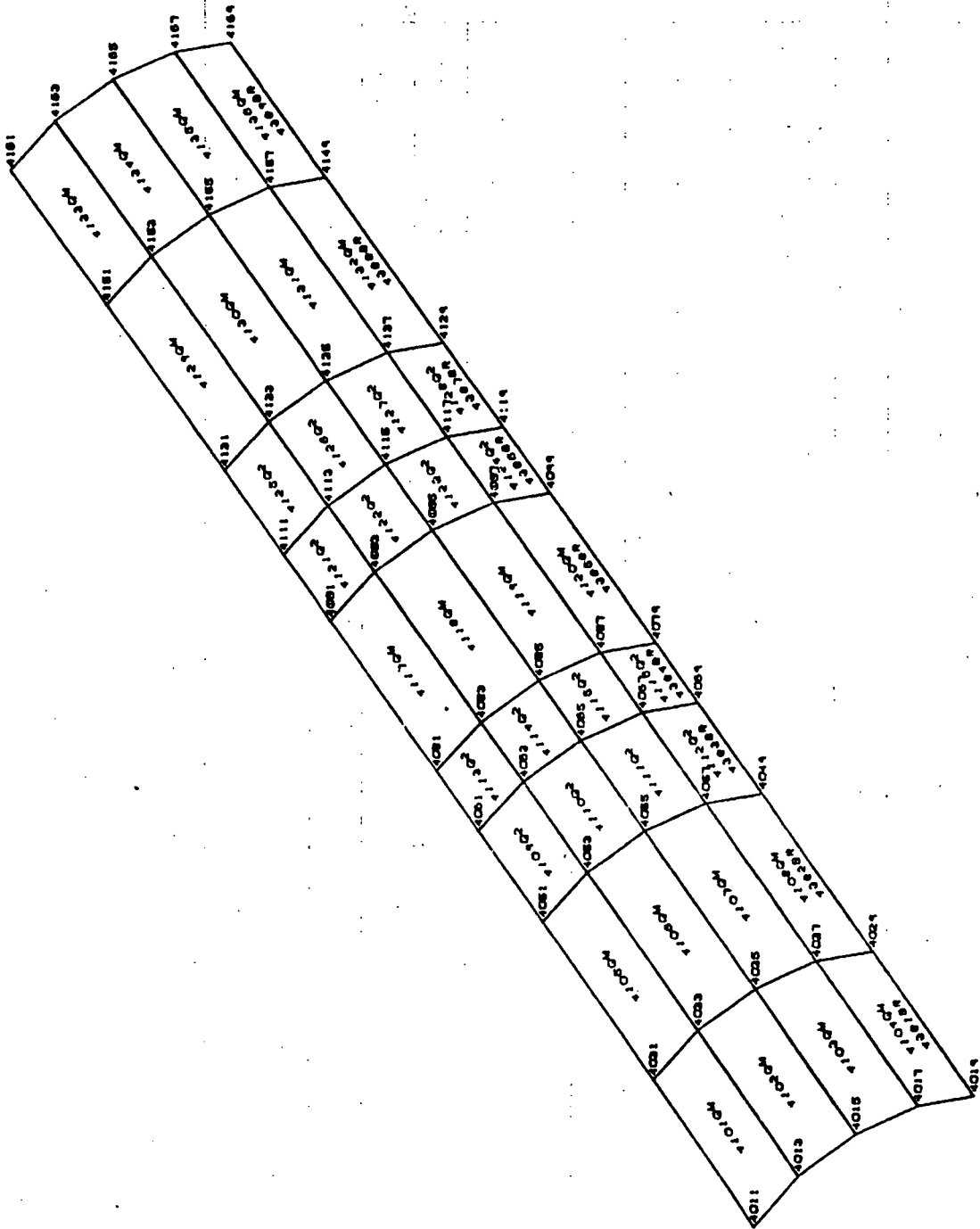
INPUT BULK DATA DECK ECHO

	1	2	3	4	5	6	7	8	9	10
\$ CONVERT SYM DOOR DATA TO ANTI CASE										
/	1									
/	209	216								
/	371									
/	417									
ASET1	2	4002	4172							
DMI	CPAJC	0	2	1	2		26	1		
DMI	CPAJC	1	1	1.0	1.0	1.0	1.0	1.0	&CPAD1	
&CPAD1	1.0	1.0	1.0	1.0	11	1.0	13	1.0	&CPAD2	
&CPAD2	15	1.0	17	1.0	1.0	1.0	1.0	1.0	&CPAD3	
&CPAD3	1.0	1.0	1.0	1.0	1.0					
DMI	EQR	0	2	1	2		3	3		
DMI	EQR	1	1	1.0	-73.0	64.0				
DMI	EQR	2	2	-10.5						
DMI	EQR	3	1	1.0	-73.0	166.5				
EIGR	1	GIV				4		1.0-4	&EIG2	
&EIG2	MAX									
PARAM	TPNAME	DORAP1								
SUPORT	4002	2	4010	3	4172	2				
PARAM	RMODE	1								
ENDDATA										

TOTAL COUNT= 21

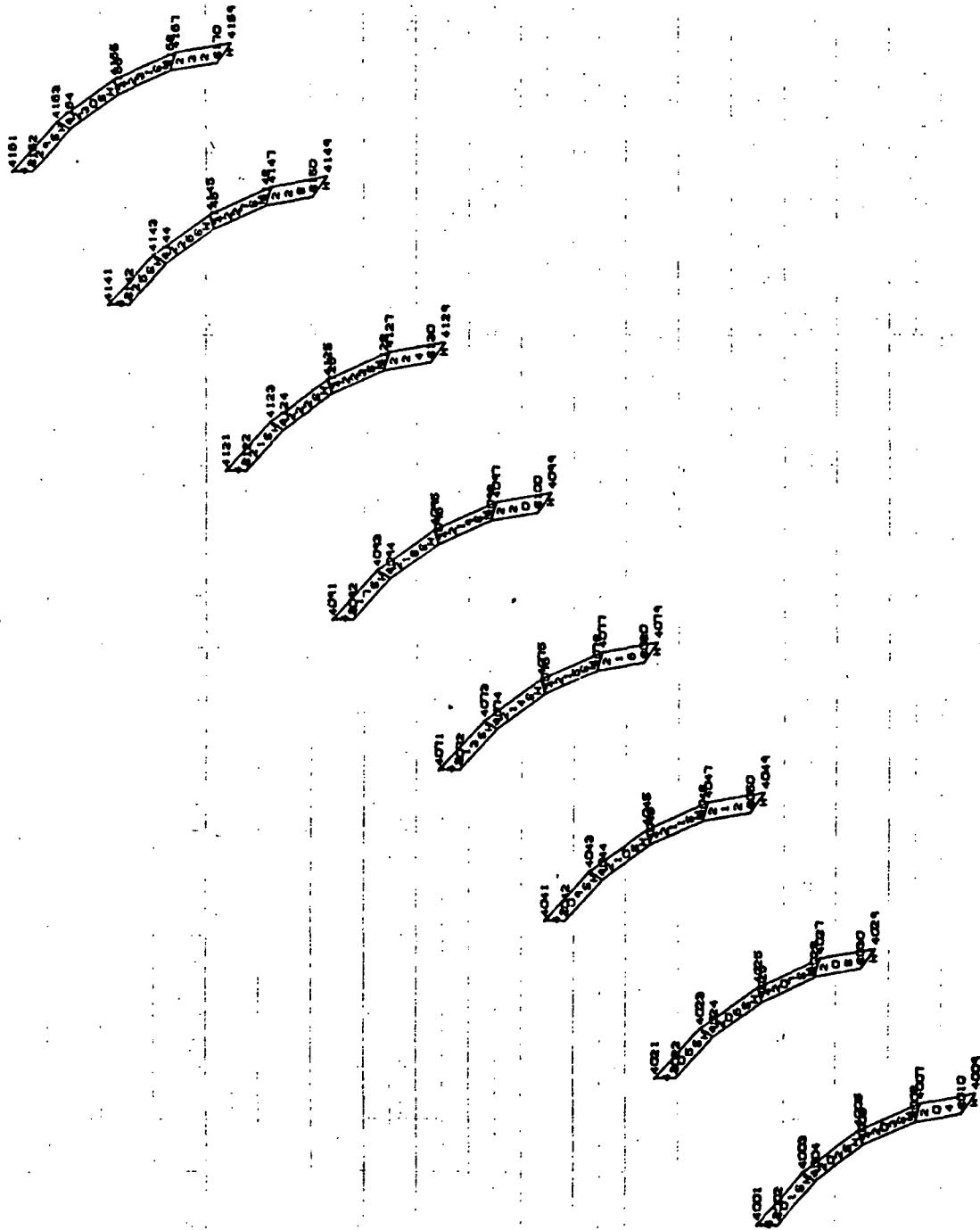
\*\*\* USER INFORMATION MESSAGE 207, BULK DATA NOT SORTED,XSORT WILL RE-ORDER DECK.

**Appendix B11**  
**PLOTS OF MEMBER DATA**  
**PHASE 1 ANALYSIS: MODEL I CARGO DOORS**



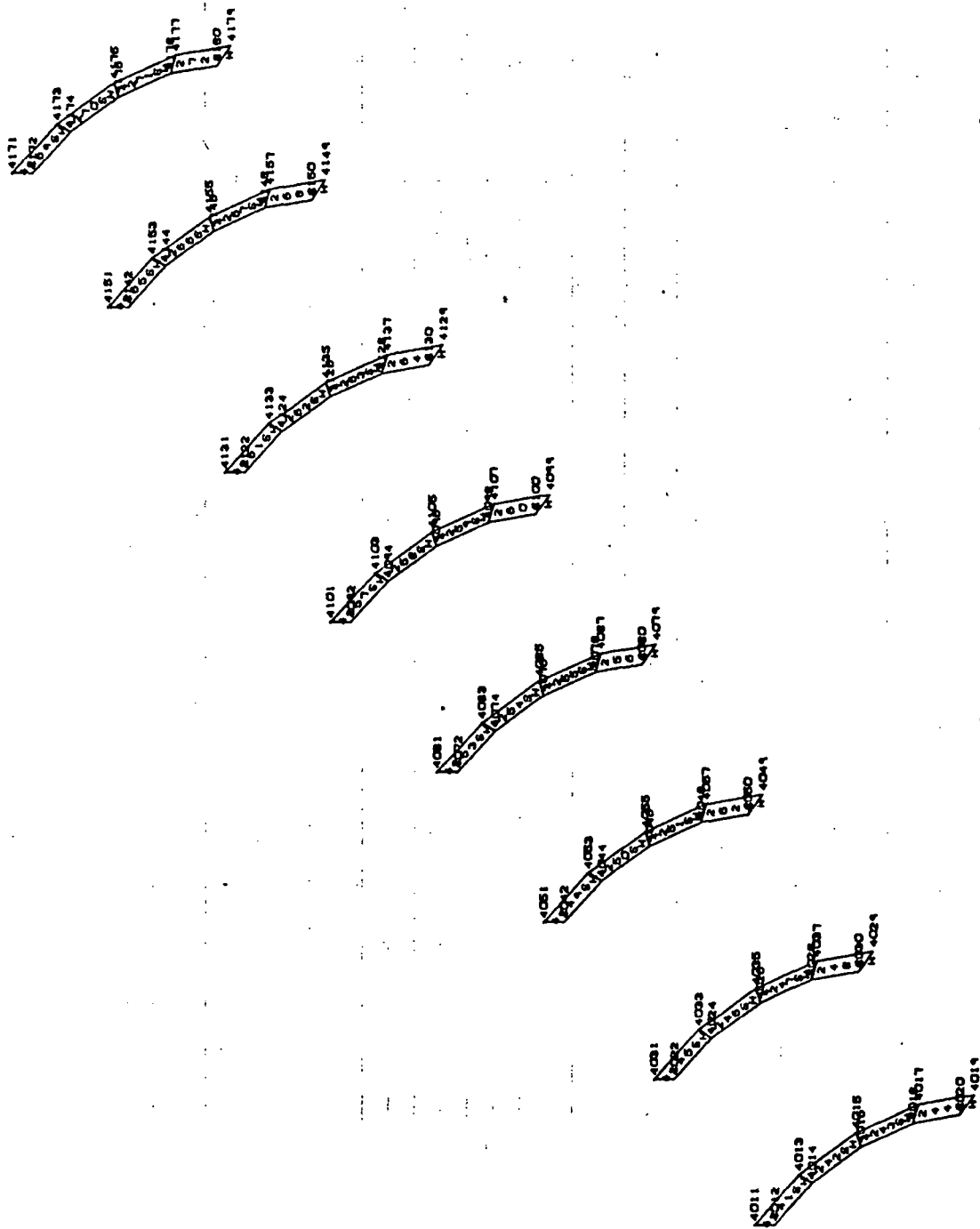
ORIGINAL PAYLOAD DOOR SHELL

PHASE I  
ORBITER SYMM CASE  
UNDEFORMED SHAPE



ORIGINAL PAYLOAD DEGR FWD FRAMES AT DOUBLE FRAME STATIONS  
(PANELS)

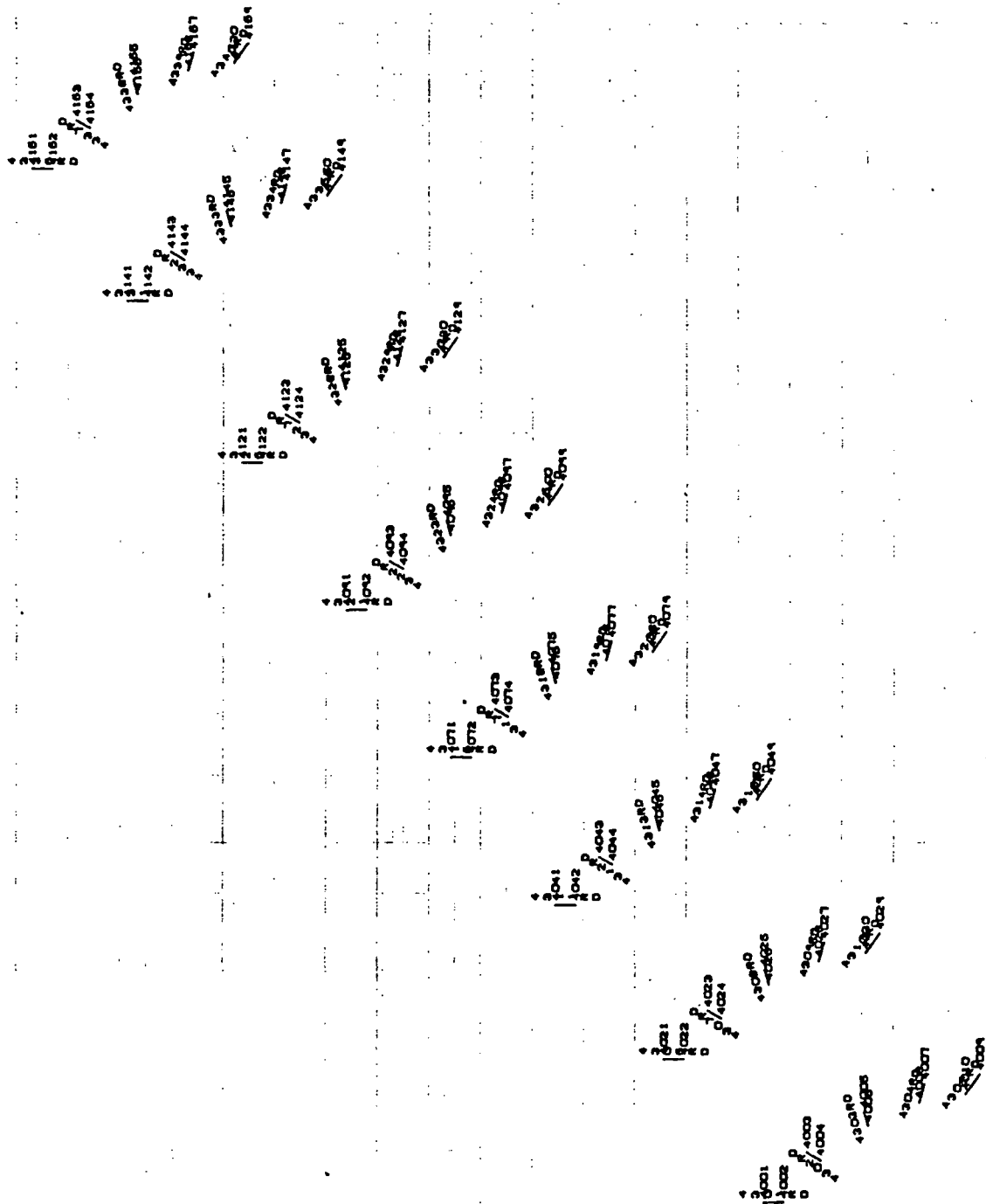
PHASE 1  
CRITTER SYM CASE  
UNDEFORMED SHAPE



ORIGINAL PAYLOAD DOOR AFT FRAMES AT DOUBLE FRAME STATIONS  
(PANELS)

PHASE 1  
ORBITER SYMM CASE  
UNDEFORMED SHAPE





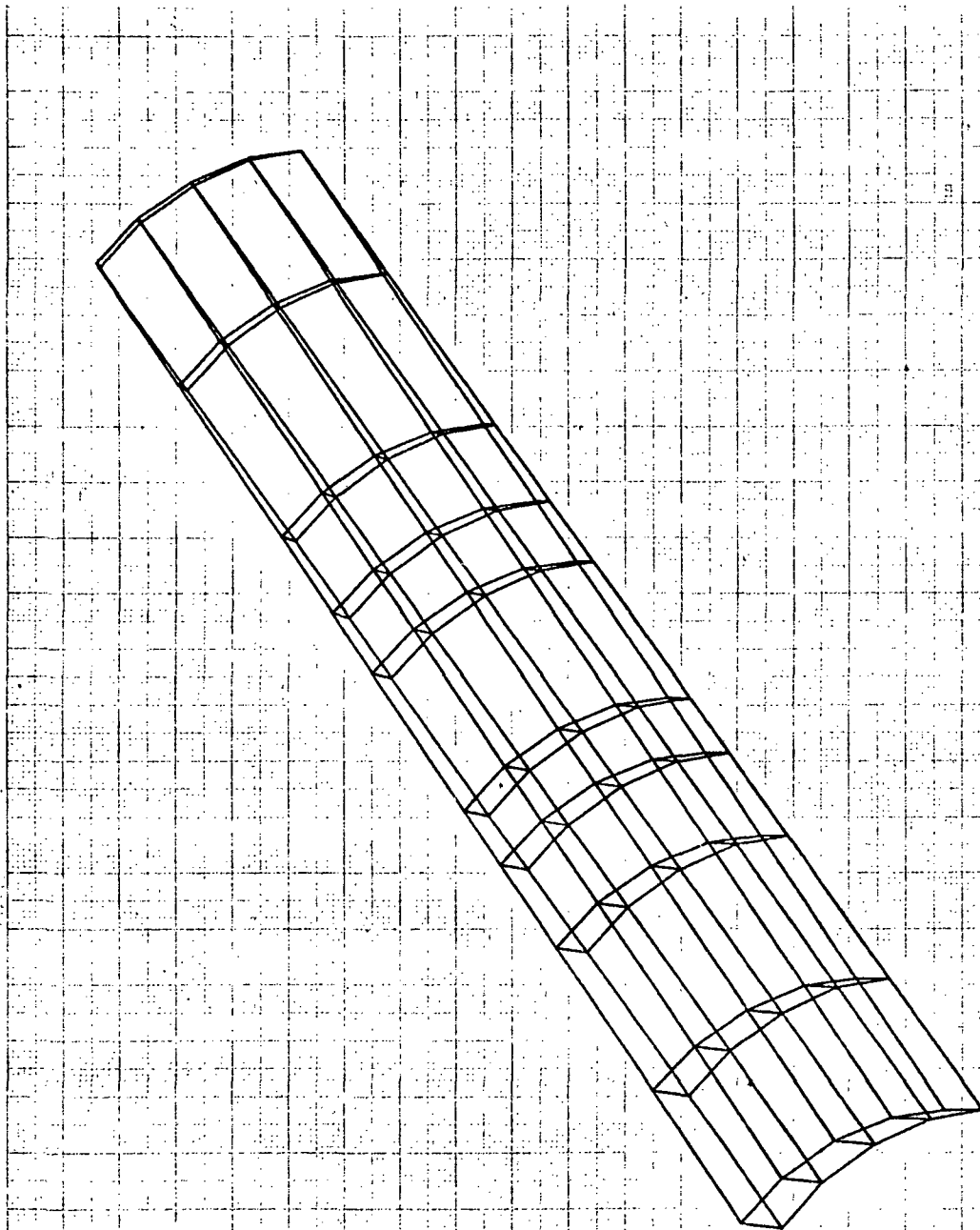






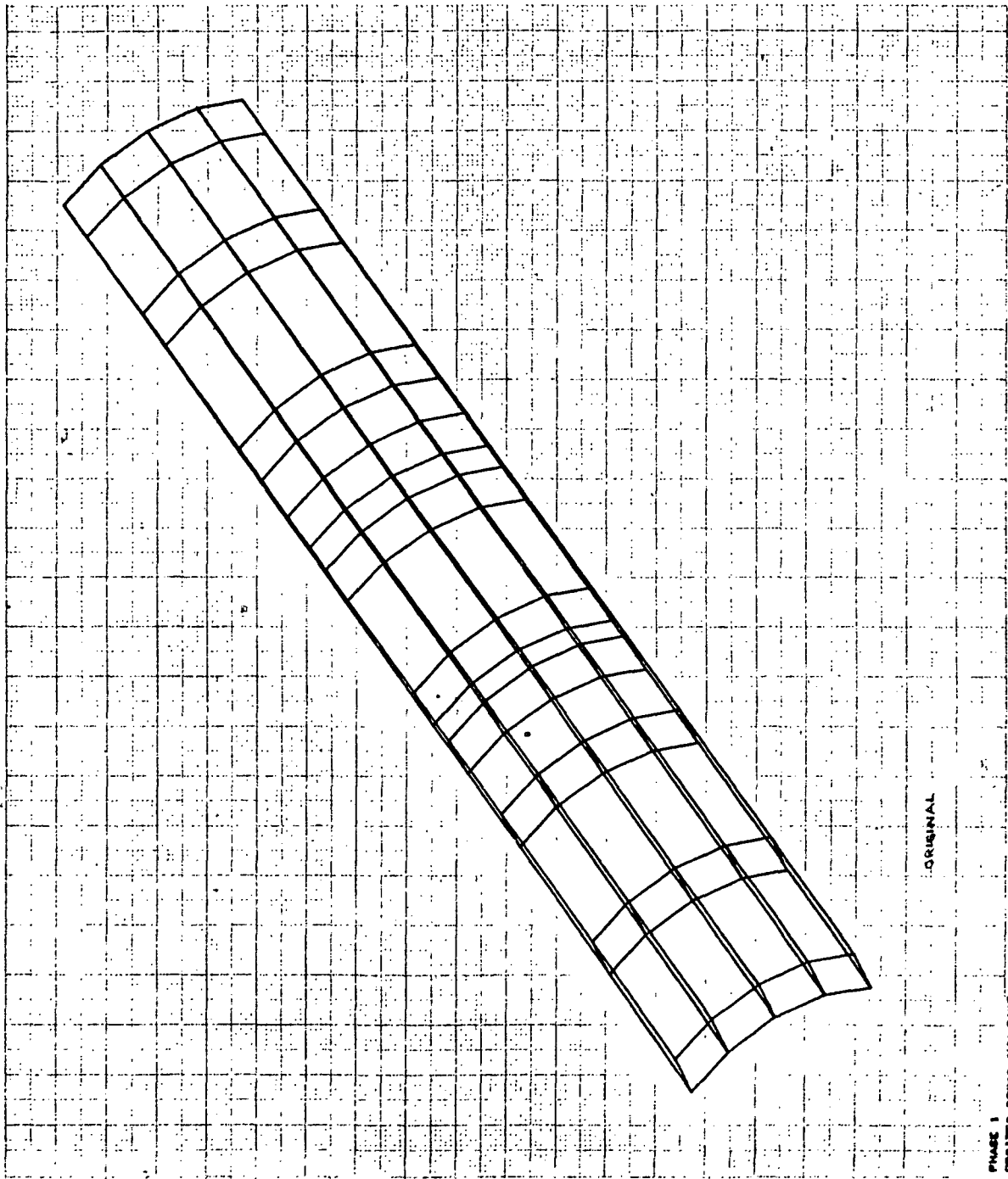
**Appendix B12**  
**PLOTS OF SYMMETRIC AND ANTISYMMETRIC MODES**  
**PHASE 1 ANALYSIS: MODEL I CARGO DOORS**

4/ 4/73 MAX-DEF. = 1.00000000



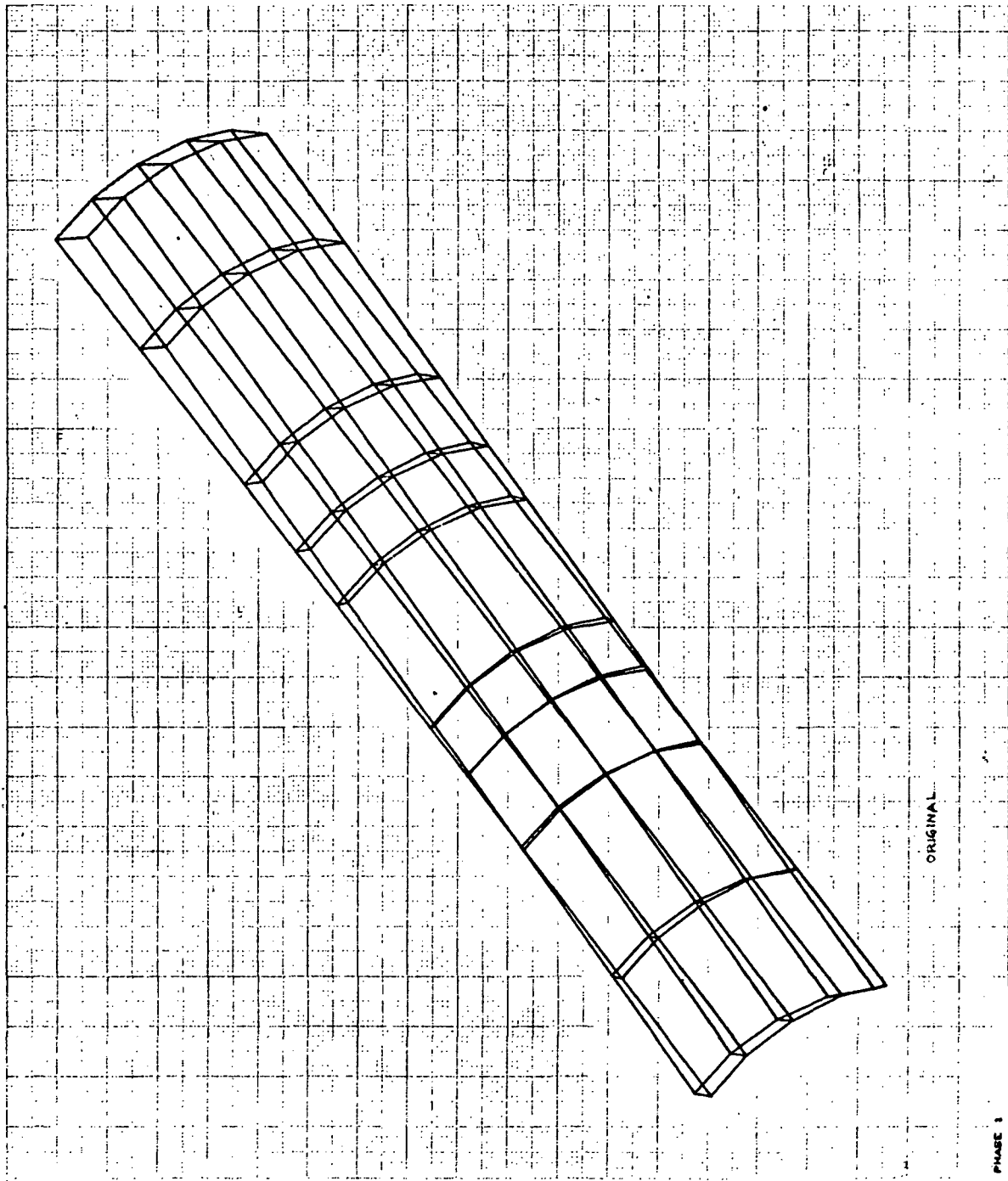
ORIGINAL

PHASE 1  
ORBITER DOORS.SVM CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 1 MODE 1 FREQ. 0.



PHASE 1  
ORBITER DOORS-SYM CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 2 MODE 2 FREQ. Q.

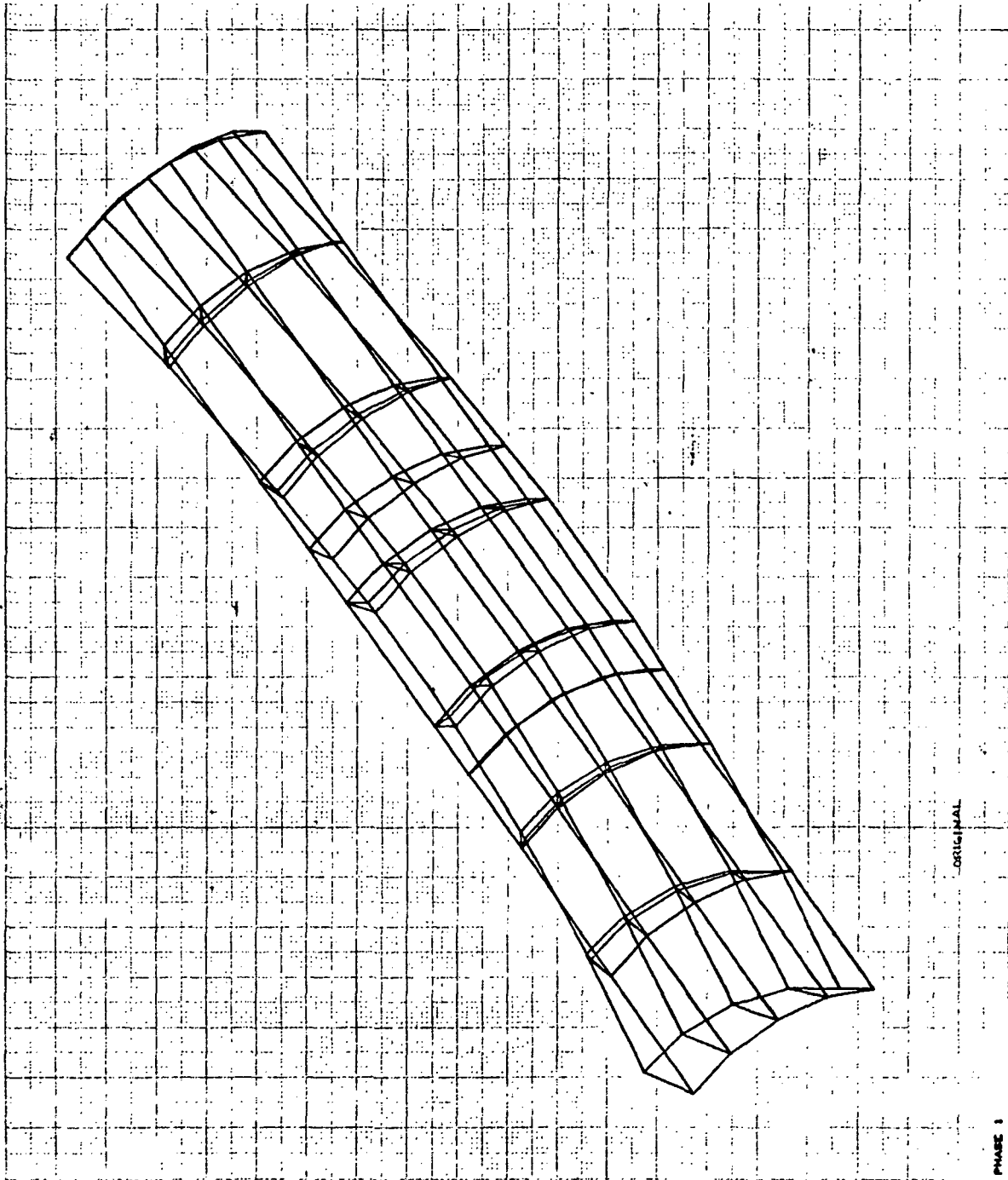
3 4/ 4/79 MAX-DEF. = 1.00000000



ORIGINAL

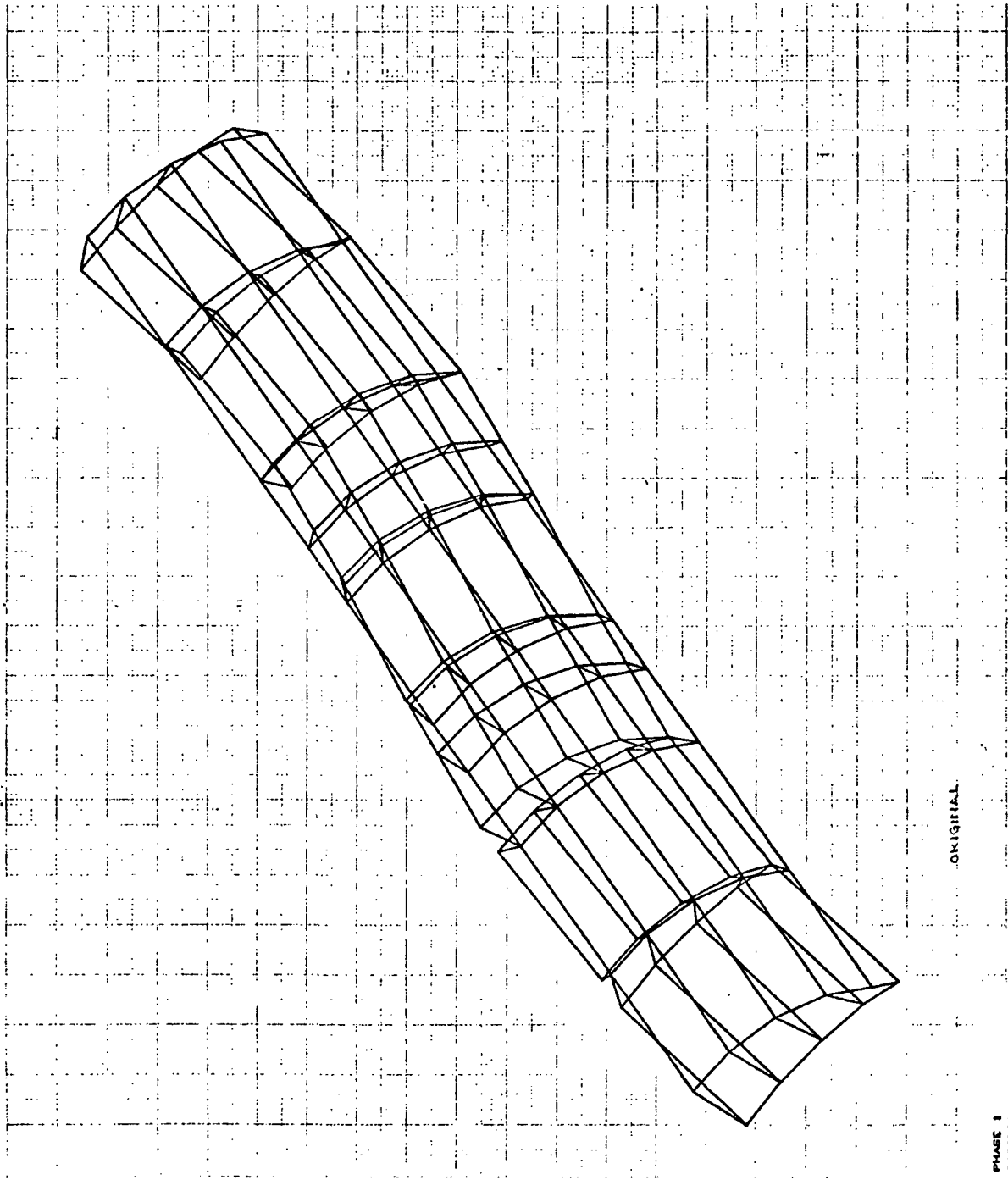
PHASE 1  
ORBITER DOORS-SYM CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 3 MODE 3 FREQ. 0.

4 4/ 4/73 MAX-DEF. = 1.0000000



PHASE 1  
ORBITER DOORS, BYA CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 4 MODE 4 FREQ. 4.574945

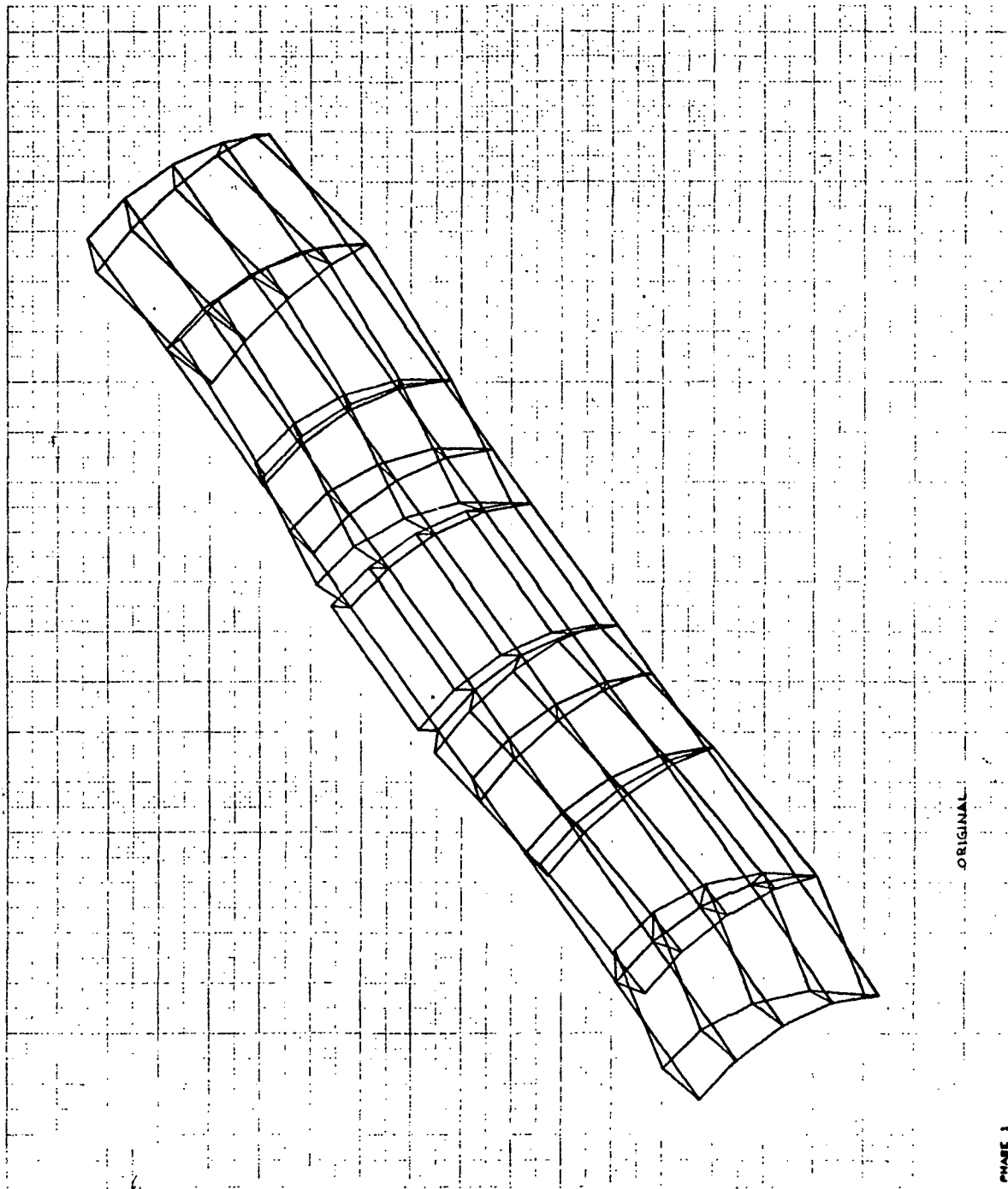
6 4/ 4/73 MAX-DEF. = 1.0112340



ORIGINAL

PHASE 1  
ORBITER DOORS, SYN CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 5 MODE 5 FREQ. 10.74508

6 4/ 4/73 MAX-DEF. = 1.08483360

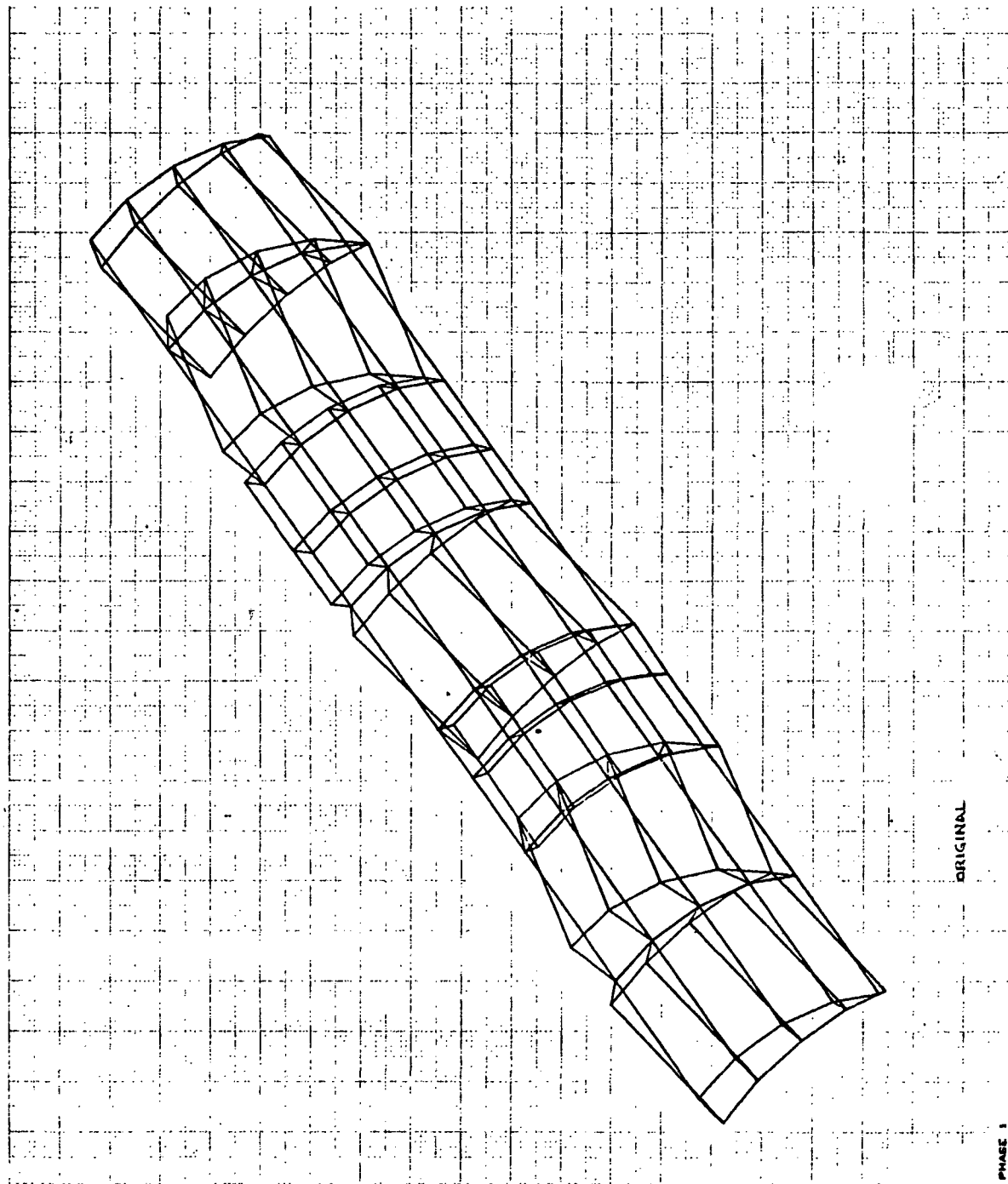


ORIGINAL

PHASE 1  
ORBITER DOORS, 8TH CASE  
FULL FREE MODES  
MODAL DEFOR. SUBCASE 6 MODE 6 FREQ. 17.85148



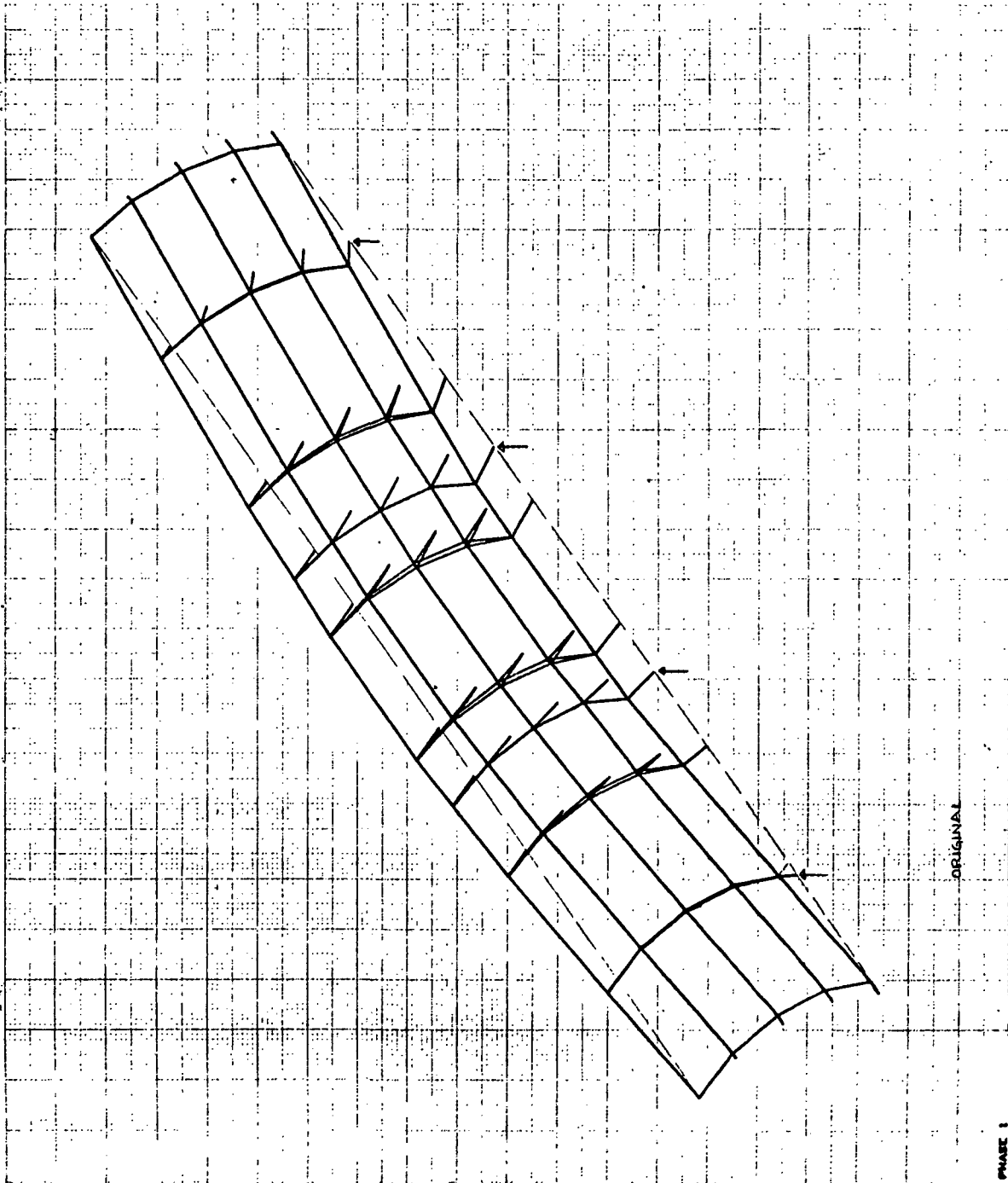
4/ 4/73 MAX-DEF. = 1.47691820



ORIGINAL

PHASE 1  
ORBITER DOORS-SYM CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 8 MODE 7 FREQ. 30.02310

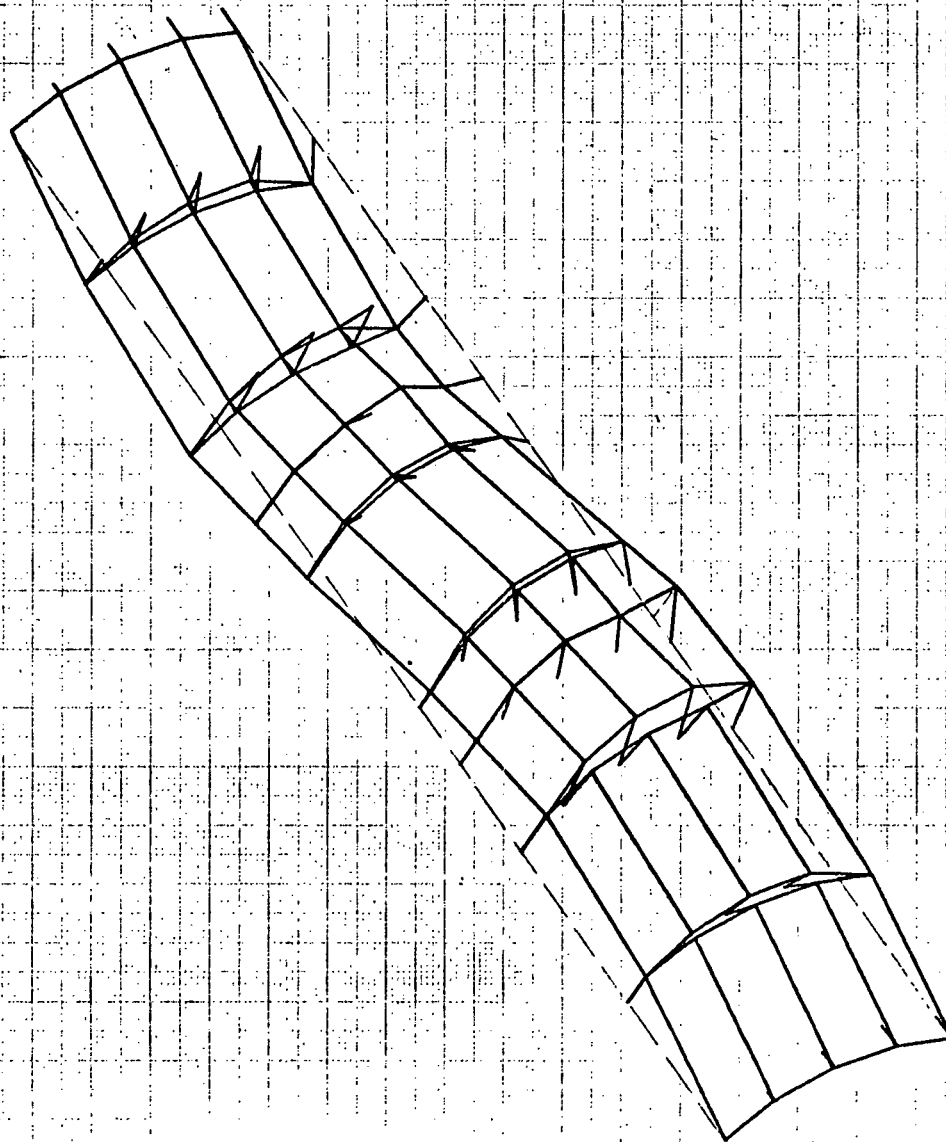
1 8/18/73 MAX-DEF. = 2.85478880



ORIGINAL

PHASE 1  
ORBITER DUCKS/ANTI CASE  
MODES (INTERFACED) FIXED AT ENDS + 2 D.O.F. AT BL 13.8  
MODAL DEFEN. SUBCASE 1 MODE 1 FREQ. 180.4103

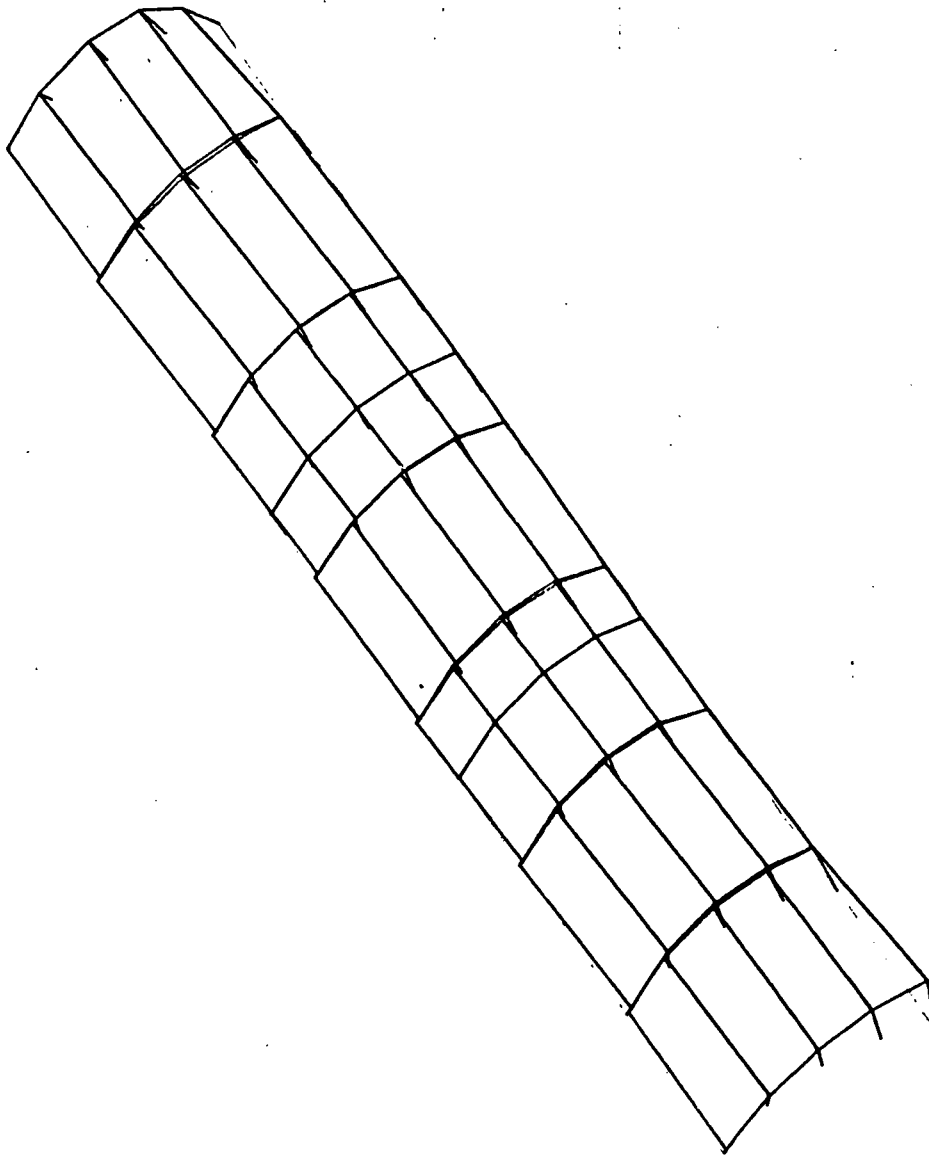
2 5/16/73 MAX-DET. = 1.65071E0



ORIGINAL

PHASE 1  
CRIBTER DOORS/ANTI CASE  
MODES (INTERFACE FIXED AT ENDS + 2 D.O.F. AT BL 13.6  
MODAL DETOR. SUBCASE 2 MODE 2 FREQ. 622.1844

3 8/18/73 MAX-DEF. = 1.00000000



ORIGINAL  
PHASE 1  
ORBITER DOORS, AMT1 CASE  
MODES (INTERFACE FIXED AT ENDS + 2 D.O.F. AT BL 12.5  
MODAL DEFOR. SUBCASE 3 MODE 3 FREQ. 1004.821

8/18/73 MAX-DEF. = 1.0000000

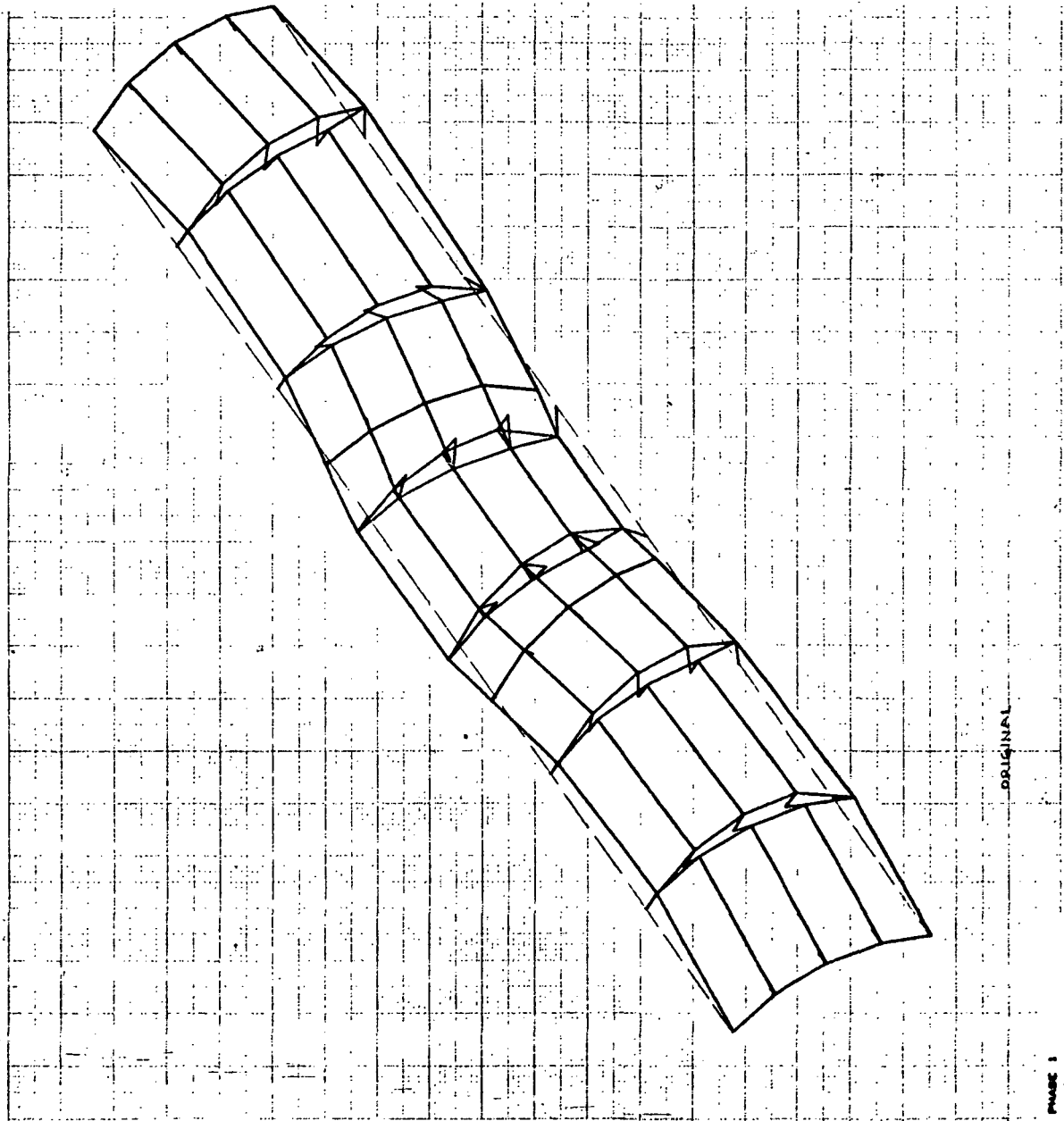


FIGURE 1  
CRITTER DOORS, ANTI CASE  
MODES (INTERFACE FIXED AT CNDS + 2 D.O.F. AT SL 12.8  
MODAL DETON. SUBCASE 4 MODE 4 FREQ. 1883.364

**Appendix B13**  
**SORTED BULK DATA**  
**PHASE 1 ANALYSIS: MODEL I FIN**

PHASE 1 (SYMM CASE)  
ORIGINAL FIN

CASE CONTROL DECK ECHO

CARD  
COUNT

1 TITLE = PHASE 1 (SYMM CASE)  
2 SUBTITLE = ORIGINAL FIN  
3 MPC = 4451  
4 SPC = 4401  
5 METHOD = 1  
6 BEGIN BULK

\*\*\* USER INFORMATION MESSAGE 207. BULK DATA NOT SORTED. XSORT WILL RE-ORDER DECK.

PHASE 1 (SYMM CASE)  
ORIGINAL FIN

SORTED BULK DATA ECHO

CARD	1	2	3	4	5	6	7	8	9	10
COUNT	1	2	3	4	5	6	7	8	9	10
1- ASET1	1	4463	4467							
2- ASET1	12	4461	4469							
3- ASET1	13	4462	4470							
4- ASET1	123	4431	4435	4439	4465					
5- ASET1	135	4400								
6- CONM1	4400	4400	0	3.000	.0	3.000	.0	.0	ECM1	
7- ECM1	3.000	0.0	0.0	0.0	0.0	1.5630	0.0	0.0	0.0	ECM2
9- ECM2	0.0	13.225	0.0	0.0	0.0	0.0	0.0	0.0	12.79	
9- CONROD	4490	4401	4411	4401	.036				.0026	
10- CONROD	4491	4402	4412	4401	.019					
11- CONROD	4492	4405	4415	4401	.026				.0016	
12- CONROD	4493	4406	4416	4401	.019					
13- CONROD	4494	4409	4419	4401	.036				.0026	
14- CONROD	4495	4410	4420	4401	.019					
15- CONROD	4496	4411	4421	4401	.037				.0026	
16- CONROD	4497	4412	4422	4401	.023					
17- CONROD	4498	4415	4425	4401	.027				.0016	
18- CONROD	4499	4416	4426	4401	.023					
19- CONROD	4500	4419	4429	4401	.037				.0026	
20- CONROD	4501	4420	4430	4401	.023					
21- CONROD	4502	4421	4431	4401	.040				.0026	
22- CONROD	4503	4422	4432	4401	.027					
23- CONROD	4504	4425	4435	4401	.030				.0016	
24- CONROD	4505	4426	4436	4401	.027					
25- CONROD	4506	4429	4439	4401	.040				.0026	
26- CONROD	4507	4430	4440	4401	.027					
27- CONROD	4508	4431	4441	4401	.042				.0026	
28- CONROD	4509	4432	4442	4401	.032					
29- CONROD	4510	4435	4445	4401	.032				.0016	
30- CONROD	4511	4436	4446	4401	.032					
31- CONROD	4512	4439	4449	4401	.042				.0026	
32- CONROD	4513	4440	4450	4401	.032					
33- CONROD	4514	4441	4451	4401	.044				.0026	
34- CONROD	4515	4442	4452	4401	.037					
35- CONROD	4516	4445	4455	4401	.090				.0072	
36- CONROD	4517	4446	4456	4401	.037					
37- CONROD	4518	4449	4459	4401	.044				.0026	
38- CONROD	4519	4450	4460	4401	.037					
39- CONROD	4520	4451	4461	4401	.026				.0026	
40- CONROD	4521	4452	4462	4401	.068					
41- CONROD	4522	4455	4465	4401	.120				.0100	
42- CONROD	4523	4456	4466	4401	.040					
43- CONROD	4524	4459	4469	4401	.026				.0026	
44- CONROD	4525	4460	4470	4401	.068					
45- CONROD	4526	4461	4463	4400	.072					
46- CONROD	4527	4463	4465	4400	.072					
47- CONROD	4528	4465	4467	4400	.150					
48- CONROD	4529	4467	4469	4400	.072					
49- CONROD2R	4412	0	166.5	.0	75.0	181.0	.0	87.5	EC4412	
50- EC4412	200.0	0.0	75.0							



PHASE 1 (SYMM CASE)  
ORIGINAL FIN

SORTED BULK DATA ECHO

CARD	1	2	3	4	5	6	7	8	9	10
COUNT	1	2	3	4	5	6	7	8	9	10
51- CORD2R	4413	0	166.5	-2.0	75.0	166.5	-0.84	87.5	EC4413	
52- EC4413	200.0	-2.0	75.0							
53- CORD2R	4416	0	176.1253.0		75.0	183.3422.0		87.5	EC4416	
54- EC4416	200.0	0.0	75.0							
55- CORD2R	4420	0	182.3663.0		75.0	186.8	.0	87.5	EC4420	
56- EC4420	200.0	0.0	75.0							
57- CQDMEM2	4401	4401	4401	4403	4413	4411	0.0			
58- CQDMEM2	4402	4401	4403	4405	4415	4413	0.0			
59- CQDMEM2	4403	4401	4405	4407	4417	4415	0.0			
60- CQDMEM2	4404	4401	4407	4409	4419	4417	0.0			
61- CQDMEM2	4405	4401	4411	4413	4423	4421	0.0			
62- CQDMEM2	4406	4401	4413	4415	4425	4423	0.0			
63- CQDMEM2	4407	4401	4415	4417	4427	4425	0.0			
64- CQDMEM2	4408	4401	4417	4419	4429	4427	0.0			
65- CQDMEM2	4409	4401	4421	4423	4433	4431	0.0			
66- CQDMEM2	4410	4401	4423	4425	4435	4433	0.0			
67- CQDMEM2	4411	4401	4425	4427	4437	4435	0.0			
68- CQDMEM2	4412	4401	4427	4429	4439	4437	0.0			
69- CQDMEM2	4413	4401	4431	4433	4443	4441	0.0			
70- CQDMEM2	4414	4401	4433	4435	4445	4443	0.0			
71- CQDMEM2	4415	4401	4435	4437	4447	4445	0.0			
72- CQDMEM2	4416	4401	4437	4439	4449	4447	0.0			
73- CQDMEM2	4417	4401	4441	4443	4453	4451	0.0			
74- CQDMEM2	4418	4401	4443	4445	4455	4453	0.0			
75- CQDMEM2	4419	4401	4445	4447	4457	4455	0.0			
76- CQDMEM2	4420	4401	4447	4449	4459	4457	0.0			
77- CQDMEM2	4421	4401	4451	4453	4463	4461	0.0			
78- CQDMEM2	4422	4401	4453	4455	4465	4463	0.0			
79- CQDMEM2	4423	4401	4455	4457	4467	4465	0.0			
80- CQDMEM2	4424	4401	4457	4459	4469	4467	0.0			
81- CROD	4461	4461	4401	4403						
82- CROD	4463	4461	4403	4405						
83- CROD	4465	4461	4405	4407						
84- CROD	4467	4461	4407	4409						
85- CROD	4469	4461	4401	4402						
86- CROD	4470	4461	4405	4406						
87- CROD	4471	4461	4409	4410						
88- CROD	4472	4472	4411	4412						
89- CROD	4473	4472	4421	4422						
90- CROD	4474	4472	4431	4432						
91- CROD	4475	4472	4441	4442						
92- CROD	4476	4472	4451	4452						
93- CROD	4477	4472	4415	4416						
94- CROD	4478	4472	4425	4426						
95- CROD	4479	4472	4435	4436						
96- CROD	4480	4472	4445	4446						
97- CROD	4481	4472	4455	4456						
98- CROD	4482	4472	4419	4420						
99- CROD	4483	4472	4429	4430						
100- CROD	4484	4472	4439	4440						

PHASE 1 (SYMM CASE)  
ORIGINAL FIN

SORTED BULK DATA ECHO

CARD	COUNT	1	2	3	4	5	6	7	8	9	10
101-	CROD	4485	4472	4449	4450						
102-	CROD	4486	4472	4459	4460						
103-	CROD	4487	4487	4461	4462						
104-	CROD	4488	4487	4465	4466						
105-	CROD	4489	4487	4469	4470						
106-	CSHEAR	4431	4431	4401	4402	4404	4403				
107-	CSHEAR	4432	4431	4403	4404	4406	4405				
108-	CSHEAR	4433	4431	4405	4406	4408	4407				
109-	CSHEAR	4434	4431	4407	4408	4410	4409				
110-	CSHEAR	4435	4435	4401	4402	4412	4411				
111-	CSHEAR	4436	4435	4411	4412	4422	4421				
112-	CSHEAR	4437	4435	4421	4422	4432	4431				
113-	CSHEAR	4438	4435	4431	4432	4442	4441				
114-	CSHEAR	4439	4435	4441	4442	4452	4451				
115-	CSHEAR	4440	4435	4451	4452	4462	4461				
116-	CSHEAR	4441	4435	4405	4406	4416	4415				
117-	CSHEAR	4442	4435	4415	4416	4426	4425				
118-	CSHEAR	4443	4435	4425	4426	4436	4435				
119-	CSHEAR	4444	4435	4435	4436	4446	4445				
120-	CSHEAR	4445	4435	4445	4446	4456	4455				
121-	CSHEAR	4446	4435	4455	4456	4466	4465				
122-	CSHEAR	4447	4435	4409	4410	4420	4419				
123-	CSHEAR	4448	4435	4419	4420	4430	4429				
124-	CSHEAR	4449	4435	4429	4430	4440	4439				
125-	CSHEAR	4450	4435	4439	4440	4450	4449				
126-	CSHEAR	4451	4435	4449	4450	4460	4459				
127-	CSHEAR	4452	4435	4459	4460	4470	4469				
128-	DMI	CPAJC	0	2	1	2		25	1		
129-	DMI	CPAJC	1	13	1.0	1.0	1.0	1.0	1.0	1.0	ECPS1
130-	ECPS1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
131-	DMI	EQR	0	2	1	2		3	5		
132-	DMI	EQR	1	1	1.0	3	75.0				
133-	DMI	EQR	2	2	1.0	3	-166.5				
134-	DMI	EQR	3	1	1.0	3	75.0				
135-	DMI	EQR	4	1	1.0	3	75.0				
136-	DMI	EQR	5	2	1.0	3	-182.366				
137-	EIGR	1	GIV				4		1.0-4	EEIG1	
138-	EEIG1	MAX									
139-	GRID	4400	0	184.1	.0	88.5					
140-	GRID	4401	0	181.0	-0.84	87.5	0	456			
141-	GRID	4402	0	181.0	.0	87.5	0	456			
142-	GRID	4403	0	182.1711	-0.84	87.5	0	456			
143-	GRID	4404	0	182.1711	.0	87.5	0	456			
144-	GRID	4405	0	183.3422	-0.84	87.5	0	456			
145-	GRID	4406	0	183.3422	.0	87.5	0	456			
146-	GRID	4407	0	185.0711	-0.84	87.5	0	456			
147-	GRID	4408	0	185.0711	.0	87.5	0	456			
148-	GRID	4409	0	186.8	-0.84	87.5	0	456			
149-	GRID	4410	0	186.8	.0	87.5	0	456			
150-	GRID	4411	0	179.26	-0.9792	86.0	0	456			

PHASE 1 (SYMM CASE)  
ORIGINAL FIN

S O R T E D   B U L K   D A T A   E C H O											
CARD	COUNT	1	2	3	4	5	6	7	8	9	10
151- GRID	4412	0			179.26 .0		86.0	4412	456		
152- GRID	4413	0			180.8006-0.9792		86.0	4413	456		
153- GRID	4415	0			182.4762-0.9792		86.0	0	456		
154- GRID	4416	0			182.4762.0		86.0	4416	456		
155- GRID	4417	0			184.3721-0.9792		86.0	4413	456		
156- GRID	4419	0			186.268 -0.9792		86.0	0	456		
157- GRID	4420	0			186.268 .0		86.0	4420	456		
158- GRID	4421	0			176.94 -1.1648		84.0	0	456		
159- GRID	4422	0			176.94 .0		84.0	4412	456		
160- GRID	4423	0			178.9732-1.1648		84.0	4413	456		
161- GRID	4425	0			181.3215-1.1648		84.0	0	456		
162- GRID	4426	0			181.3215.0		84.0	4416	456		
163- GRID	4427	0			183.4400-1.1648		84.0	4413	456		
164- GRID	4429	0			185.5586-1.1648		84.0	0	456		
165- GRID	4430	0			185.5586.0		84.0	4420	456		
166- GRID	4431	0			174.04 -1.3968		81.5	0	456		
167- GRID	4432	0			174.04 .0		81.5	4412	456		
168- GRID	4433	0			176.689 -1.3968		81.5	4413	456		
169- GRID	4435	0			179.8781-1.3968		81.5	0	456		
170- GRID	4436	0			179.8781.0		81.5	4416	456		
171- GRID	4437	0			182.275 -1.3968		81.5	4413	456		
172- GRID	4439	0			184.6718-1.3968		81.5	0	456		
173- GRID	4440	0			184.6718.0		81.5	4420	456		
174- GRID	4441	0			171.14 -1.6288		79.0	0	456		
175- GRID	4442	0			171.14 .0		79.0	4412	456		
176- GRID	4443	0			174.4048-1.6288		79.0	4413	456		
177- GRID	4445	0			178.4347-1.6288		79.0	0	456		
178- GRID	4446	0			178.4347.0		79.0	4416	456		
179- GRID	4447	0			181.1099-1.6288		79.0	4413	456		
180- GRID	4449	0			183.7851-1.6288		79.0	0	456		
181- GRID	4450	0			183.7851.0		79.0	4420	456		
182- GRID	4451	0			168.82 -1.8144		77.0	0	456		
183- GRID	4452	0			168.82 .0		77.0	4412	456		
184- GRID	4453	0			172.5774-1.8144		77.0	4413	456		
185- GRID	4455	0			177.28 -1.8144		77.0	0	456		
186- GRID	4456	0			177.28 .0		77.0	4416	456		
187- GRID	4457	0			180.1778-1.8144		77.0	4413	456		
188- GRID	4459	0			183.0757-1.8144		77.0	0	456		
189- GRID	4460	0			183.0757.0		77.0	4420	456		
190- GRID	4461	0			166.5 -2.0		75.0	0	456		
191- GRID	4462	0			166.5 .0		75.0	0	456		
192- GRID	4463	0			170.75 -2.0		75.0	4413	456		
193- GRID	4465	0			176.1253-2.0		75.0	0	456		
194- GRID	4466	0			176.1253.0		75.0	4416	456		
195- GRID	4467	0			179.2458-2.0		75.0	4413	456		
196- GRID	4469	0			182.3663-2.0		75.0	0	456		
197- GRID	4470	0			182.3663.0		75.0	0	456		
199- MAT1	4400	10.5E6			.3		.1				
199- MAT1	4401	10.5E6			.3		.0				
200- MPC	4449	4412	1		1.0		4411	1	-.652940	ENC4412A	

PHASE 1 (SYMM CASE)  
ORIGINAL FIN

S O R T E D   B U L K   D A T A   E C H O											
CARD	COUNT	1	2	3	4	5	6	7	8	9	10
201-	EMC4412A			4411	3	.75741					
202-	MPC	4449		4416	1	1.0	4415	1	-.866025		EMC4416A
203-	EMC4416A			4415	3	.50					
204-	MPC	4449		4420	1	1.0	4419	1	-.942470		EMC4420A
205-	EMC4420A			4419	3	.33429					
206-	MPC	4449		4422	1	1.0	4421	1	-.652940		EMC4422A
207-	EMC4422A			4421	3	.75741					
208-	MPC	4449		4426	1	1.0	4425	1	-.866025		EMC4426A
209-	EMC4426A			4425	3	.50					
210-	MPC	4449		4430	1	1.0	4429	1	-.942470		EMC4430A
211-	EMC4430A			4429	3	.33429					
212-	MPC	4449		4432	1	1.0	4431	1	-.652940		EMC4432A
213-	EMC4432A			4431	3	.75741					
214-	MPC	4449		4436	1	1.0	4435	1	-.866025		EMC4436A
215-	EMC4436A			4435	3	.50					
216-	MPC	4449		4440	1	1.0	4439	1	-.942470		EMC4440A
217-	EMC4440A			4439	3	.33429					
218-	MPC	4449		4442	1	1.0	4441	1	-.652940		EMC4442A
219-	EMC4442A			4441	3	.75741					
220-	MPC	4449		4446	1	1.0	4445	1	-.866025		EMC4446A
221-	EMC4446A			4445	3	.50					
222-	MPC	4449		4450	1	1.0	4449	1	-.942470		EMC4450A
223-	EMC4450A			4449	3	.33429					
224-	MPC	4449		4452	1	1.0	4451	1	-.652940		EMC4452A
225-	EMC4452A			4451	3	.75741					
226-	MPC	4449		4456	1	1.0	4455	1	-.866025		EMC4456A
227-	EMC4456A			4455	3	.50					
228-	MPC	4449		4460	1	1.0	4459	1	-.942470		EMC4460A
229-	EMC4460A			4459	3	.33429					
230-	MPC	4449		4466	1	1.0	4465	1	-.866025		EMC4466A
231-	EMC4466A			4465	3	.50					
232-	MPC	4450		4401	1	1.0	4400	1	-1.0		EMC4401X
233-	EMC4401X			4400	5	1.0	4400	6	-0.84		
234-	MPC	4450		4401	2	1.0	4400	2	-1.0		EMC4401Y
235-	EMC4401Y			4400	4	-1.0	4400	6	3.1		
236-	MPC	4450		4401	3	1.0	4400	3	-1.0		EMC4401Z
237-	EMC4401Z			4400	4	.84	4400	5	-3.1		
238-	MPC	4450		4402	1	1.0	4400	1	-1.0		EMC4402X
239-	EMC4402X			4400	5	1.0	4400	6	0.0		
240-	MPC	4450		4402	2	1.0	4400	2	-1.0		EMC4402Y
241-	EMC4402Y			4400	4	-1.0	4400	6	3.1		
242-	MPC	4450		4402	3	1.0	4400	3	-1.0		EMC4402Z
243-	EMC4402Z			4400	4	.00	4400	5	-3.1		
244-	MPC	4450		4403	1	1.0	4400	1	-1.0		EMC4403X
245-	EMC4403X			4400	5	1.0	4400	6	-0.84		
246-	MPC	4450		4403	2	1.0	4400	2	-1.0		EMC4403Y
247-	EMC4403Y			4400	4	-1.0	4400	6	1.9289		
248-	MPC	4450		4403	3	1.0	4400	3	-1.0		EMC4403Z
249-	EMC4403Z			4400	4	.84	4400	5	-1.9289		
250-	MPC	4450		4404	1	1.0	4400	1	-1.0		EMC4404X

PHASE 1 (SYMM CASE)  
ORIGINAL FIN

SORTED BULK DATA ECHO

CARD	COUNT	1	2	3	4	5	6	7	8	9	10
251-	EMC4404X			4400	5	1.0	4400	6	0.0		
252-	MPC	4450	4404	2	1.0	4400	2	-1.0		EMC4404Y	
253-	EMC4404Y		4400	4	-1.0	4400	6	1.9289			
254-	MPC	4450	4404	3	1.0	4400	3	-1.0		EMC4404Z	
255-	EMC4404Z		4400	4	.00	4400	5	-1.9289			
256-	MPC	4450	4405	1	1.0	4400	1	-1.0		EMC4405X	
257-	EMC4405X		4400	5	1.0	4400	6	-0.84			
258-	MPC	4450	4405	2	1.0	4400	2	-1.0		EMC4405Y	
259-	EMC4405Y		4400	4	-1.0	4400	6	0.7578			
260-	MPC	4450	4405	3	1.0	4400	3	-1.0		EMC4405Z	
261-	EMC4405Z		4400	4	.84	4400	5	-0.7578			
262-	MPC	4450	4406	1	1.0	4400	1	-1.0		EMC4406X	
263-	EMC4406X		4400	5	1.0	4400	6	0.0			
264-	MPC	4450	4406	2	1.0	4400	2	-1.0		EMC4406Y	
265-	EMC4406Y		4400	4	-1.0	4400	6	0.7578			
266-	MPC	4450	4406	3	1.0	4400	3	-1.0		EMC4406Z	
267-	EMC4406Z		4400	4	.00	4400	5	-0.7578			
268-	MPC	4450	4407	1	1.0	4400	1	-1.0		EMC4407X	
269-	EMC4407X		4400	5	1.0	4400	6	-0.84			
270-	MPC	4450	4407	2	1.0	4400	2	-1.0		EMC4407Y	
271-	EMC4407Y		4400	4	-1.0	4400	6	-.9711			
272-	MPC	4450	4407	3	1.0	4400	3	-1.0		EMC4407Z	
273-	EMC4407Z		4400	4	.84	4400	5	0.9711			
274-	MPC	4450	4408	1	1.0	4400	1	-1.0		EMC4408X	
275-	EMC4408X		4400	5	1.0	4400	6	0.0			
276-	MPC	4450	4408	2	1.0	4400	2	-1.0		EMC4408Y	
277-	EMC4408Y		4400	4	-1.0	4400	6	-.9711			
278-	MPC	4450	4408	3	1.0	4400	3	-1.0		EMC4408Z	
279-	EMC4408Z		4400	4	.00	4400	5	0.9711			
280-	MPC	4450	4409	1	1.0	4400	1	-1.0		EMC4409X	
281-	EMC4409X		4400	5	1.0	4400	6	-0.84			
282-	MPC	4450	4409	2	1.0	4400	2	-1.0		EMC4409Y	
283-	EMC4409Y		4400	4	-1.0	4400	6	-2.7000			
284-	MPC	4450	4409	3	1.0	4400	3	-1.0		EMC4409Z	
285-	EMC4409Z		4400	4	.84	4400	5	2.7			
286-	MPC	4450	4410	1	1.0	4400	1	-1.0		EMC4410X	
287-	EMC4410X		4400	5	1.0	4400	6	0.0			
288-	MPC	4450	4410	2	1.0	4400	2	-1.0		EMC4410Y	
289-	EMC4410Y		4400	4	-1.0	4400	6	-2.7000			
290-	MPC	4450	4410	3	1.0	4400	3	-1.0		EMC4410Z	
291-	EMC4410Z		4400	4	.00	4400	5	2.7			
292-	MPC	4450	4411	2	3.2162	4411	2	-1.66843		EMC4411A	
293-	EMC4411A		4411	3	.15483	4415	2	-1.53430		EMC4411B	
294-	EMC4411B		4415	3	.142356						
295-	MPC	4450	4417	2	1.0	4415	2	-.497861		EMC4417A	
296-	EMC4417A		4415	3	.046201	4419	2	-.497861		EMC4417B	
297-	EMC4417B		4419	3	.046201						
298-	MPC	4450	4423	2	4.3815	4421	2	-2.33825		EMC4423A	
299-	EMC4423A		4421	3	.21699	4425	2	-2.02450		EMC4423B	
300-	EMC4423B		4425	3	.187874						

PHASE 1 (SYMM CASE)  
ORIGINAL FIN

SORTED BULK DATA ECHO

CARD	COUNT	1	2	3	4	5	6	7	8	9	10
301-	MPC	4450	4427	2	1.0	4425	2	-	.497861		EMC4427A
302-	EMC4427A		4425	3	.046201	4429	2	-	.497861		EMC4427B
303-	EMC4427B		4429	3	.046201						
304-	MPC	4450	4433	2	5.8381	4431	2	-	3.17546		EMC4433A
305-	EMC4433A		4431	3	.294682	4435	2	-	2.63767		EMC4433B
306-	EMC4433B		4435	3	.244775						
307-	MPC	4450	4437	2	1.0	4435	2	-	.497861		EMC4437A
308-	EMC4437A		4435	3	.046201	4439	2	-	.497861		EMC4437B
309-	EMC4437B		4439	3	.046201						
310-	MPC	4450	4443	2	7.2947	4441	2	-	4.01266		EMC4443A
311-	EMC4443A		4441	3	.372375	4445	2	-	3.25083		EMC4443B
312-	EMC4443B		4445	3	.301677						
313-	MPC	4450	4447	2	1.0	4445	2	-	.497861		EMC4447A
314-	EMC4447A		4445	3	.046201	4449	2	-	.497861		EMC4447B
315-	EMC4447B		4449	3	.046201						
316-	MPC	4450	4453	2	8.46	4451	2	-	4.68248		EMC4453A
317-	EMC4453A		4451	3	.434534	4455	2	-	3.74133		EMC4453B
318-	EMC4453B		4455	3	.347195						
319-	MPC	4450	4457	2	1.0	4455	2	-	.497861		EMC4457A
320-	EMC4457A		4455	3	.046201	4459	2	-	.497861		EMC4457B
321-	EMC4457B		4459	3	.046201						
322-	MPC	4450	4463	2	9.6253	4461	2	-	5.35230		EMC4463A
323-	EMC4463A		4461	3	.496694	4465	2	-	4.23182		EMC4463B
324-	EMC4463B		4465	3	.392713						
325-	MPC	4450	4467	2	1.0	4465	2	-	.497861		EMC4467A
326-	EMC4467A		4465	3	.046201	4469	2	-	.497861		EMC4467B
327-	EMC4467B		4469	3	.046201						
328-	MPCADD	4451	4449	4450							
329-	PARAM	GRDPNT	0								
330-	PARAM	RMODE	1								
331-	PARAM	TPCCPY	1								
332-	PARAM	TPNAME	FINSPI								
333-	PARAM	WTMASS	.002588								
334-	PQDMEM2	4401	4400	.02	.0						
335-	PROD	4461	4400	.034	.0	.0	.0				
336-	PROD	4472	4401	.034	.0	.0	.0				
337-	PROD	4487	4400	.064	.0	.0	.0				
338-	RSHEAR	4431	4400	.04	.0						
339-	PSHEAR	4435	4400	.032	.0						
340-	SPC	4401	4400	246							
341-	SPC	4402	4400	135							
342-	SPC1	4401	2	4412	4416	4420	4422	4426	4430	6SPS1	
343-	6SPS1	4432	4436	4440	4442	4446	4450	4452	4456	6SPS2	
344-	6SPS2	4460	4462	4466	4470						
345-	SPC1	4402	13	4412	4416	4420	4422	4426	4430	6SPA1	
346-	6SPA1	4432	4436	4440	4442	4446	4450	4452	4456	6SPA2	
347-	6SPA2	4460	4462	4466	4470						
348-	SUPORT	4462	13	4466	1	4470	13				
	ENDDATA										

PHASE 1 (ANTI CASE)  
ORIGINAL FIN

C A S E   C O N T R O L   D E C K   E C H O	
CARD	
COUNT	
1	TITLE = PHASE 1 (ANTI CASE)
2	SUBTITLE = ORIGINAL FIN
3	ECHO = EOTH
4	MPC = 4450
5	SPC = 4402
6	METHOD = 1
7	BEGIN BULK

PHASE 1 (ANTI CASE)  
ORIGINAL FIN

INPUT BULK DATA DECK ECHO

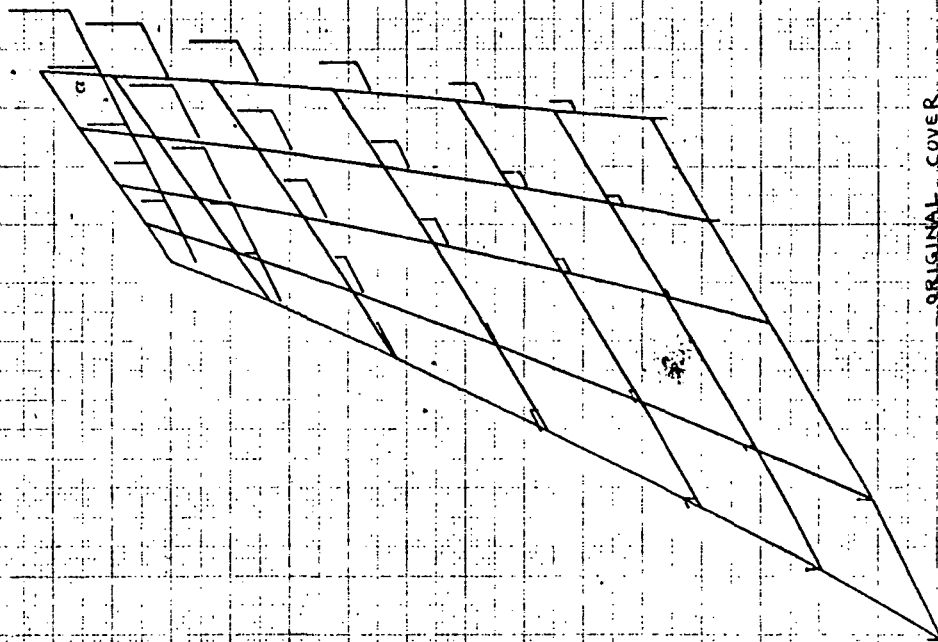
	1	2	3	4	5	6	7	8	9	10
\$ CCNVERT ORIGINAL SYMM FIN TO ORIGINAL ANTI FIN										
/	3									
/	5									
/	128	136								
/	332									
/	348									
ASET1	2	4462	4470	4466						
ASET1	246	4400								
DMI	CPAJC	0	2	1	2		24	1		
DMI	CPAJC	1	13	1.0	1.0	1.0	1.0	1.0	1.0	6CPA1
6CPA1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		
DMI	EQR	0	2	1	2		3	3		
DMI	EQR	1	1	1.0	-75.0	166.5				
DMI	EQR	2	2	-2.0						
DMI	EQR	3	1	1.0	-75.0	182.366				
PARAM	TPNAME	FINAP1								
SUPORT	4462	2	4465	3	4470	2				
ENDCATA										

TOTAL COUNT= 18



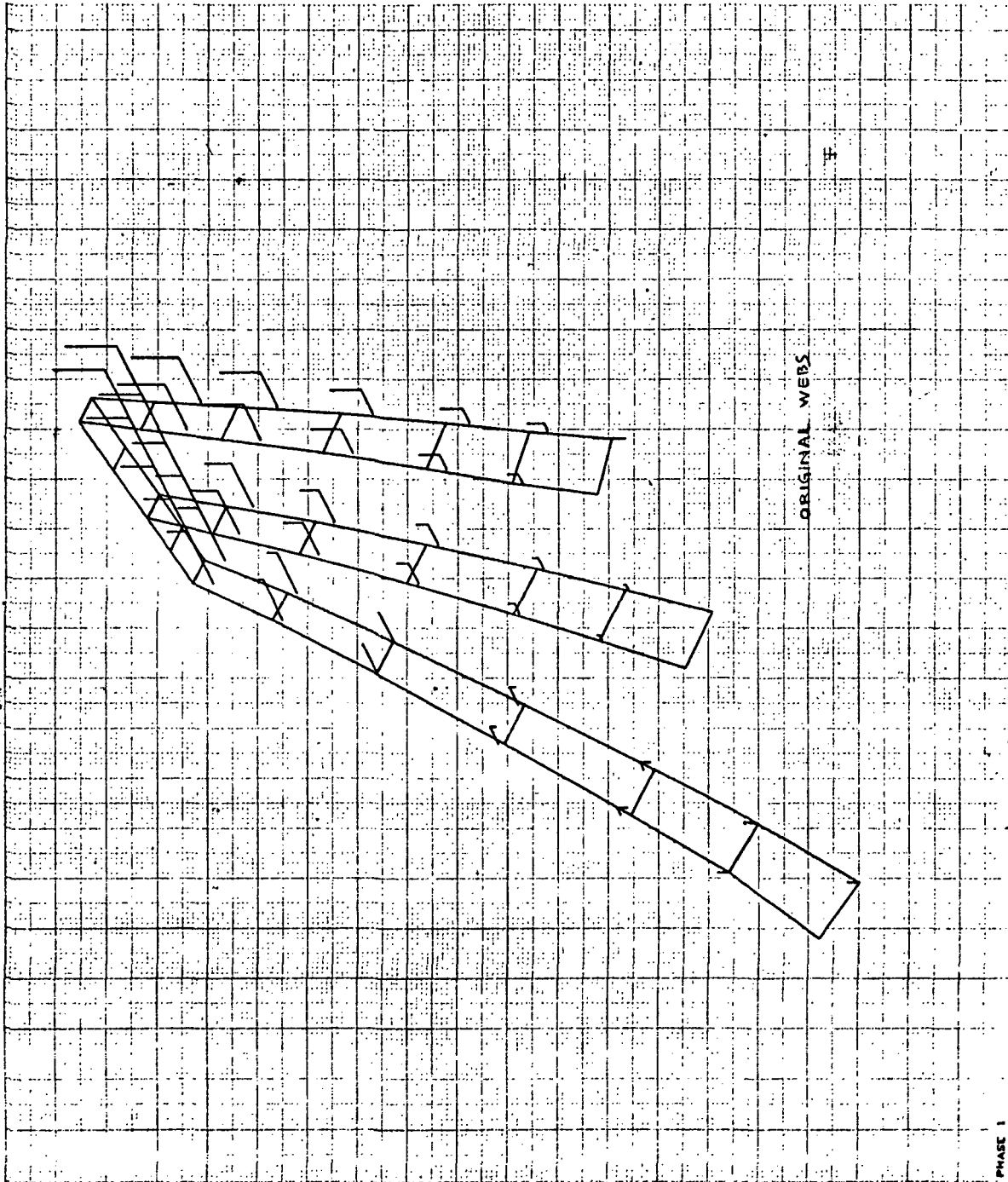
**Appendix 15**  
**PLOTS OF SYMMETRIC AND ANTISYMMETRIC MODES**  
**PHASE 1 ANALYSIS: MODEL I FIN**

8/23/73 MAX-DEF. = 1.00000000



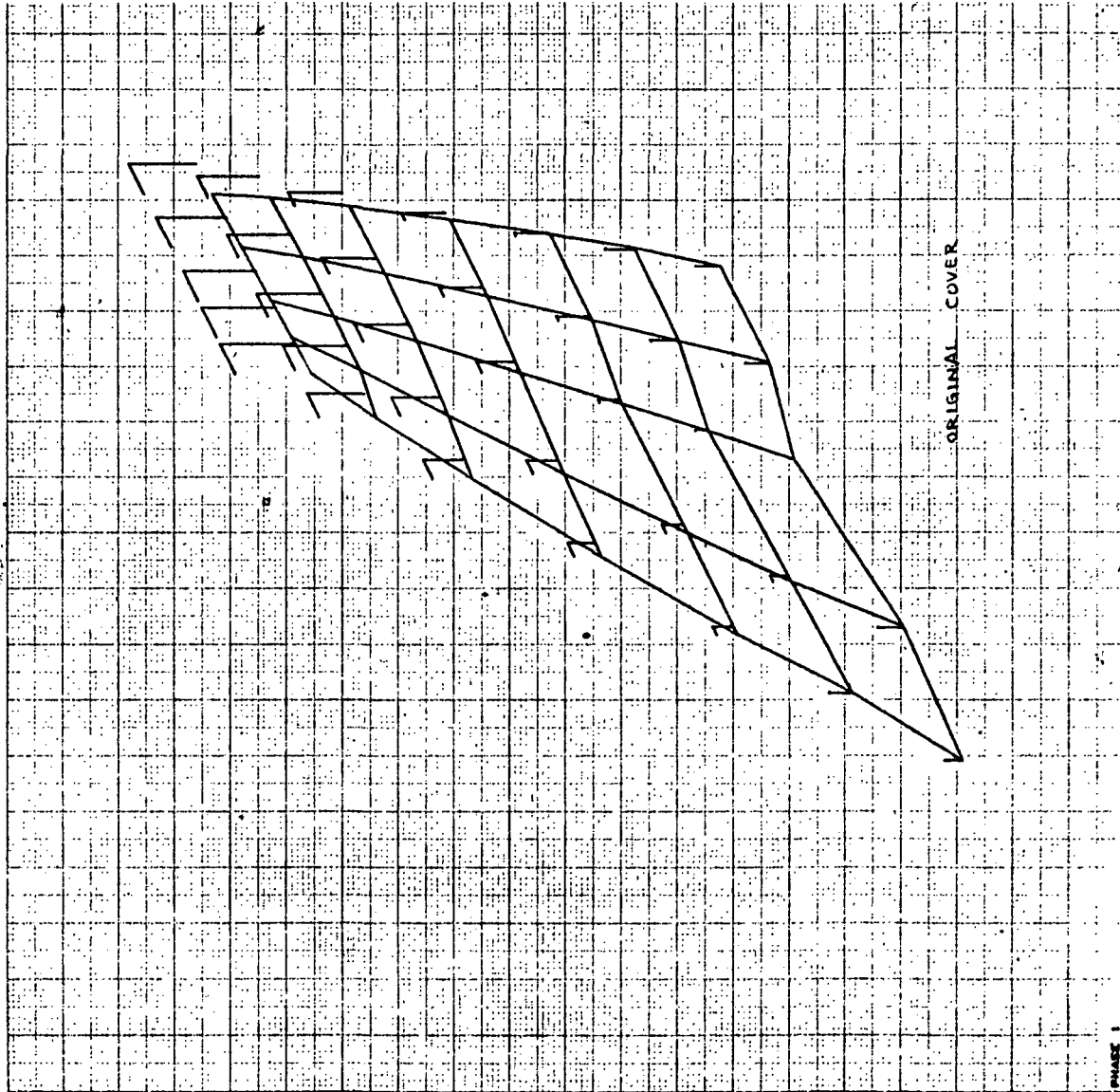
PHASE 1  
ORBITER FIN-SYM CASE (Ballast decreased to 6 in)  
FREE MODES FIXED AT INTERFACE  
MODAL DEFON. SUBCASE 1 MODE 1 FREQ. 284.1894

8 9/23/73 MAX-DEF. = 1.00000000



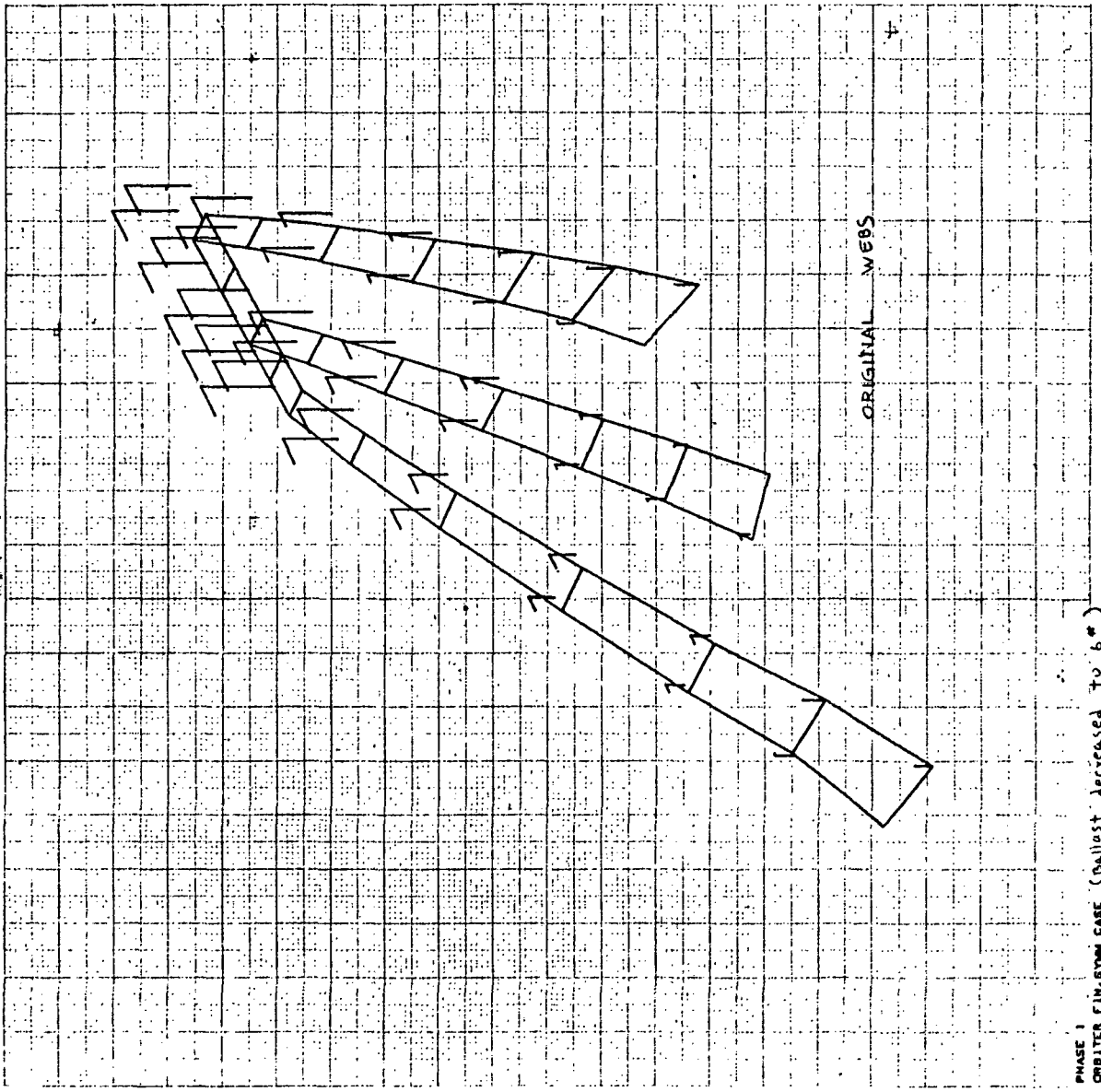
PHASE 1  
ORBITER FIN-SYM CASE (Ballast decreased to 6%)  
FACE MODES FIXED AT INTERFACE  
MODAL DEFOR. SUBCASE 1 MODE 1 FREQ. 204.1894

2 9/23/73 MAX-DEF. = 1.0086380



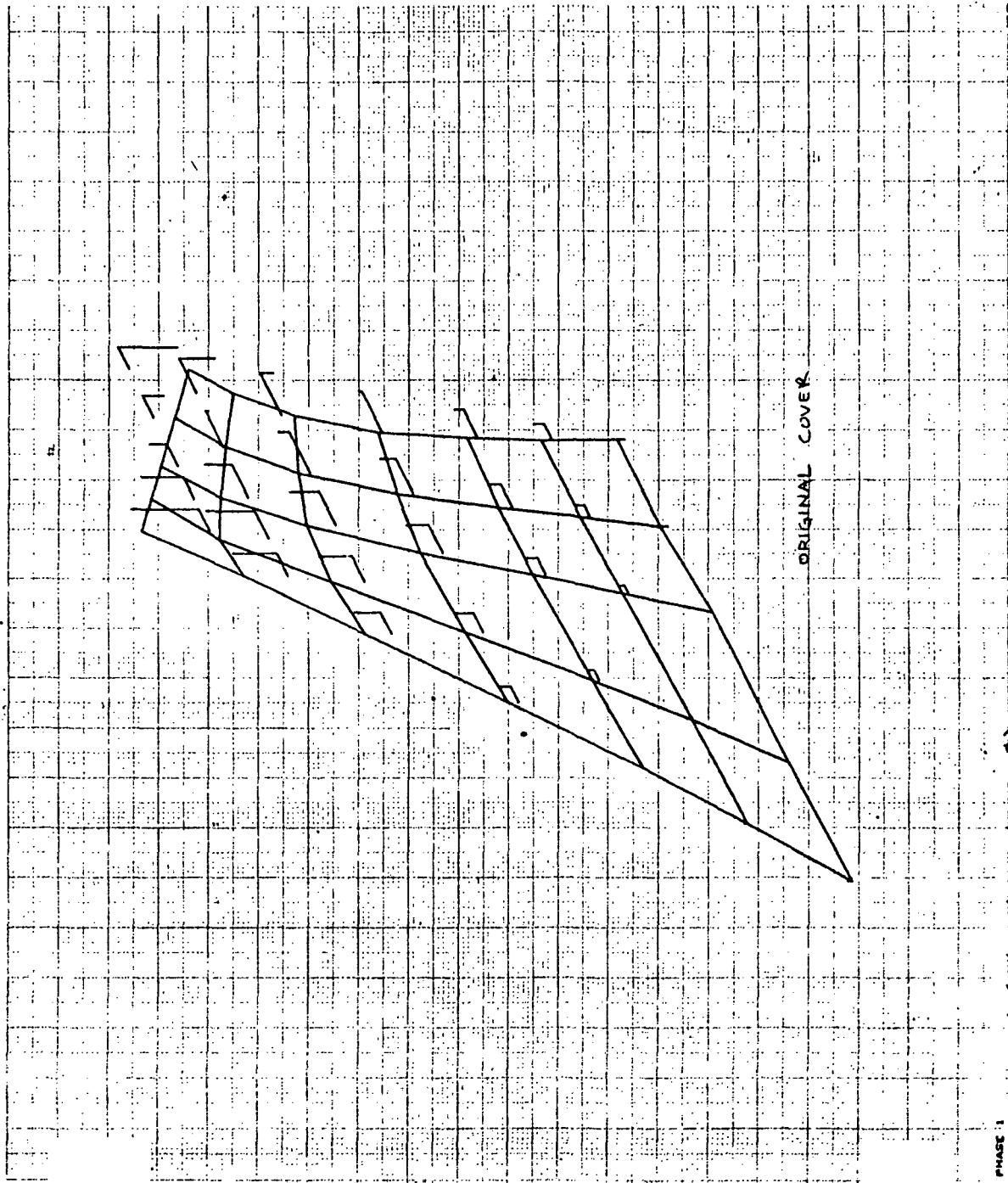
PHASE 1  
 ORBITER FIN. SYMM CASE (Ballast decreased to 6%)  
 FREE MODES FIXED AT INTERFACE  
 MODAL DEFOR. SURFACE 2 MODE 2 FREQ. 041.2788

6 9/23/73 MAX-DEF. = 1.0586380



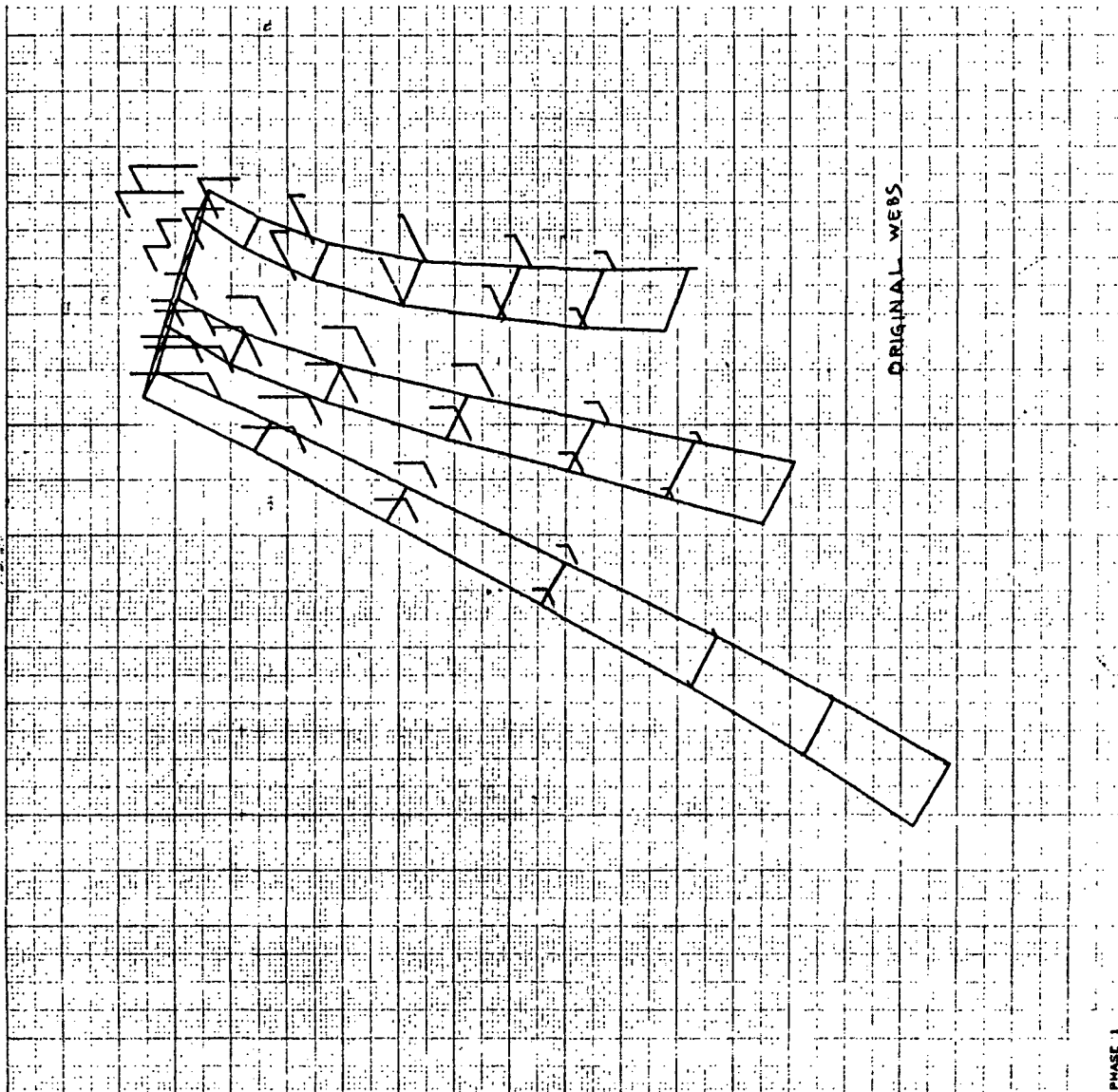
PHASE 1  
ORBITER FLW. SYMM CASE (Ballast decreased to 6")  
FREE MODES FIXED AT INTERFACE  
MODAL DEFOR. SUBCASE 2 MODE 2 FREQ. 841.2786

3 8/23/73 MAX-DEF. = 1.37521500



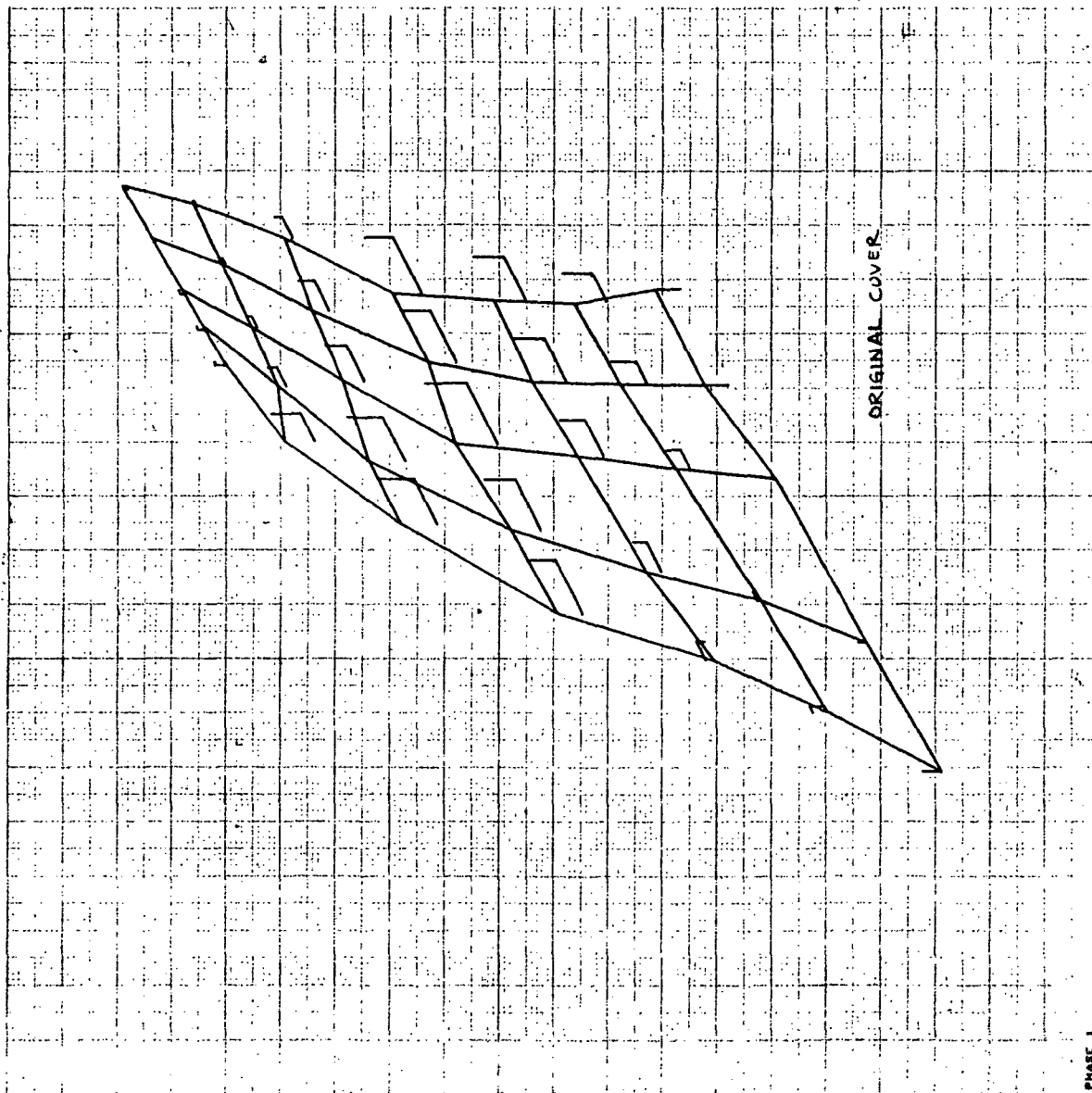
PHASE 1  
ORBITER FIN. SYMM CASE (Ballast decreased to 6")  
FREE MODES FIXED AT INTERFACE  
MODAL DEFOR. SUBCASE 3 MODE 3 FREQ. 1283.339

7 8/23/73 MAX-DEF. = 1.37831600



PHASE 1  
ORBITER FIN. STAGE CASE (Ballast decreased to 6.0)  
FREE MODES FIXED AT INTERFACE  
MODAL ORDER: SUBCASE 2 MODE 3 FREQ. 1283.334

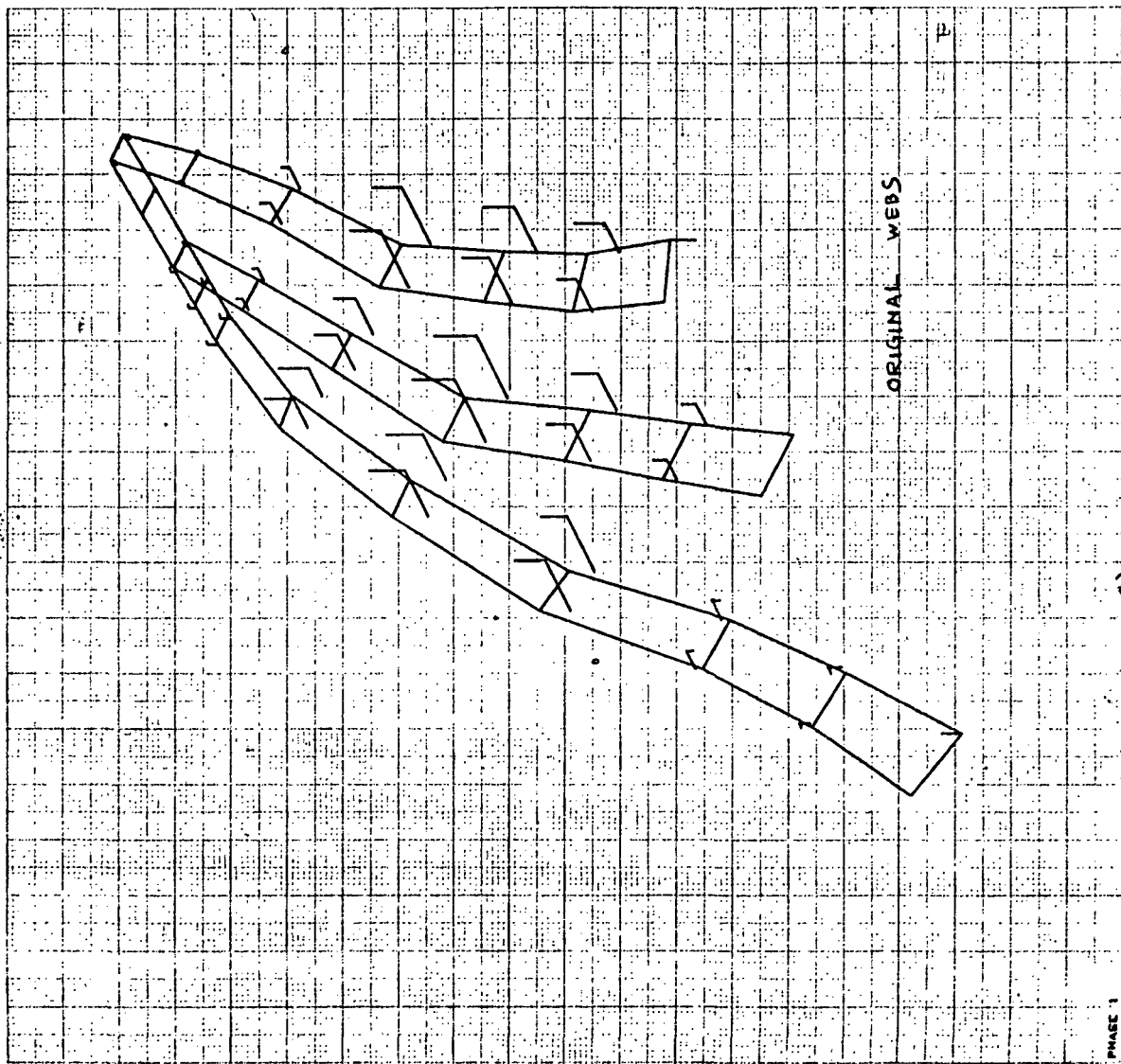
0/23/73 MAX-DEF. = 1.00048180



PHASE 1  
ONBITER FIN. SYMM CASE (Dallast decreased to 6.4)  
FREE MODES FIXED AT INTERFACE  
MODAL DEFORM. SUBCASE 4 MODE 4 FREQ. 3143.284

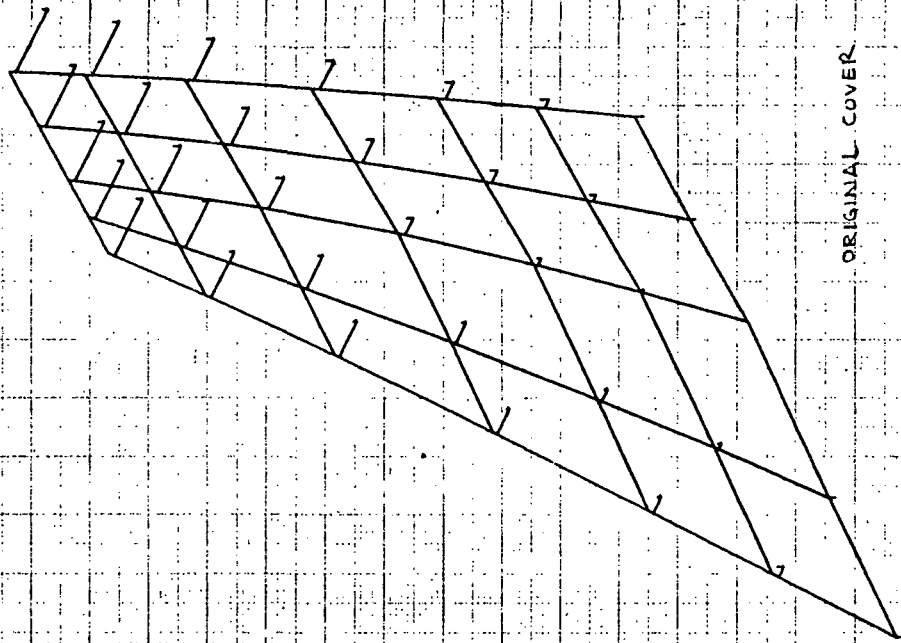


8 8/22/73 MAX-DEF. = 1.00048150



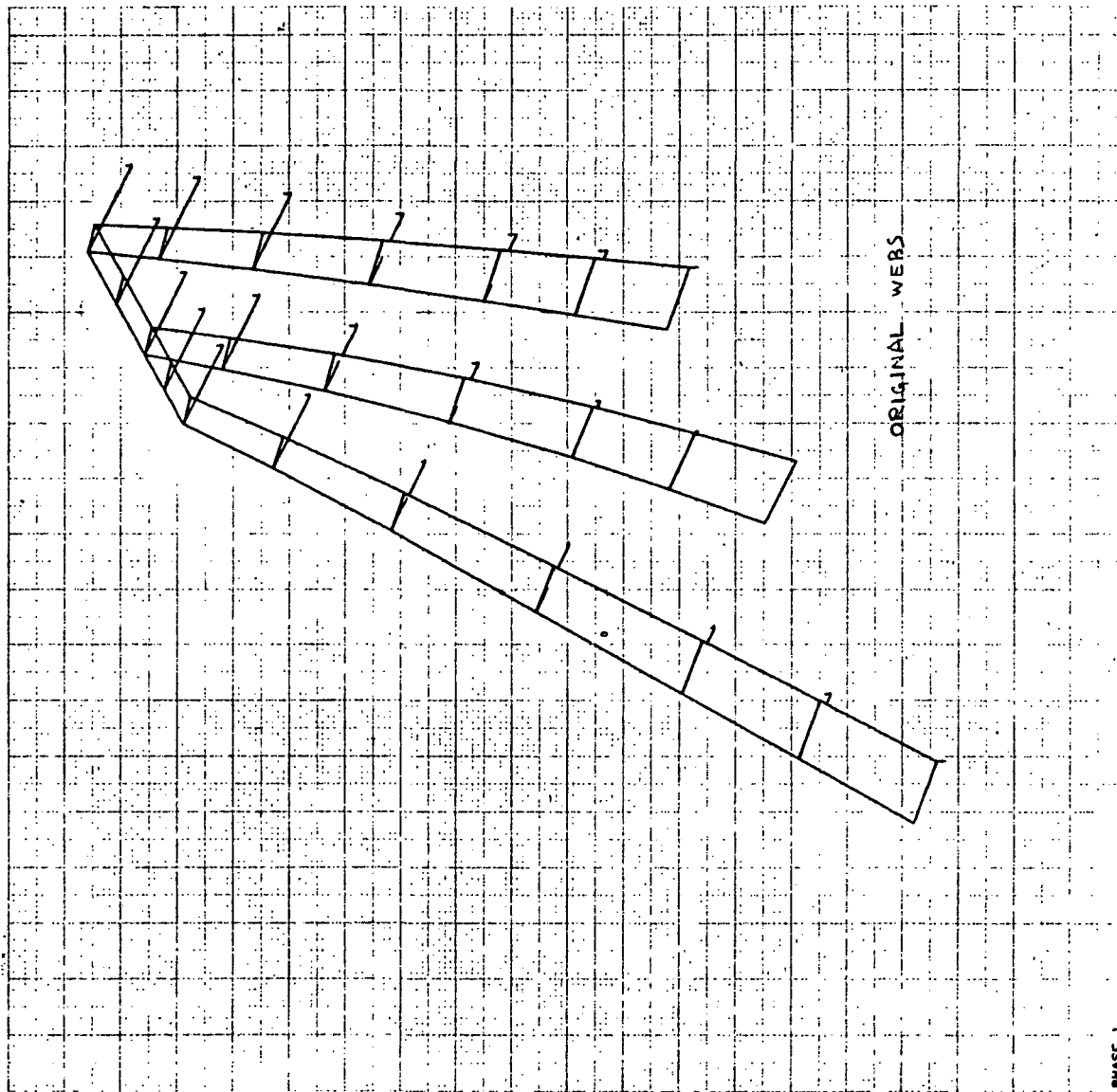
PHASE 1  
ORBITER FIN. SYM CASE (Ballast decreased to 64)  
FREE MODES FIXED AT INTERFACE  
MODAL DEFOR. SUBCASE 4 MODE 4 FREQ. 3143.284

8/23/73 MAX-DEF. = 1.00000000



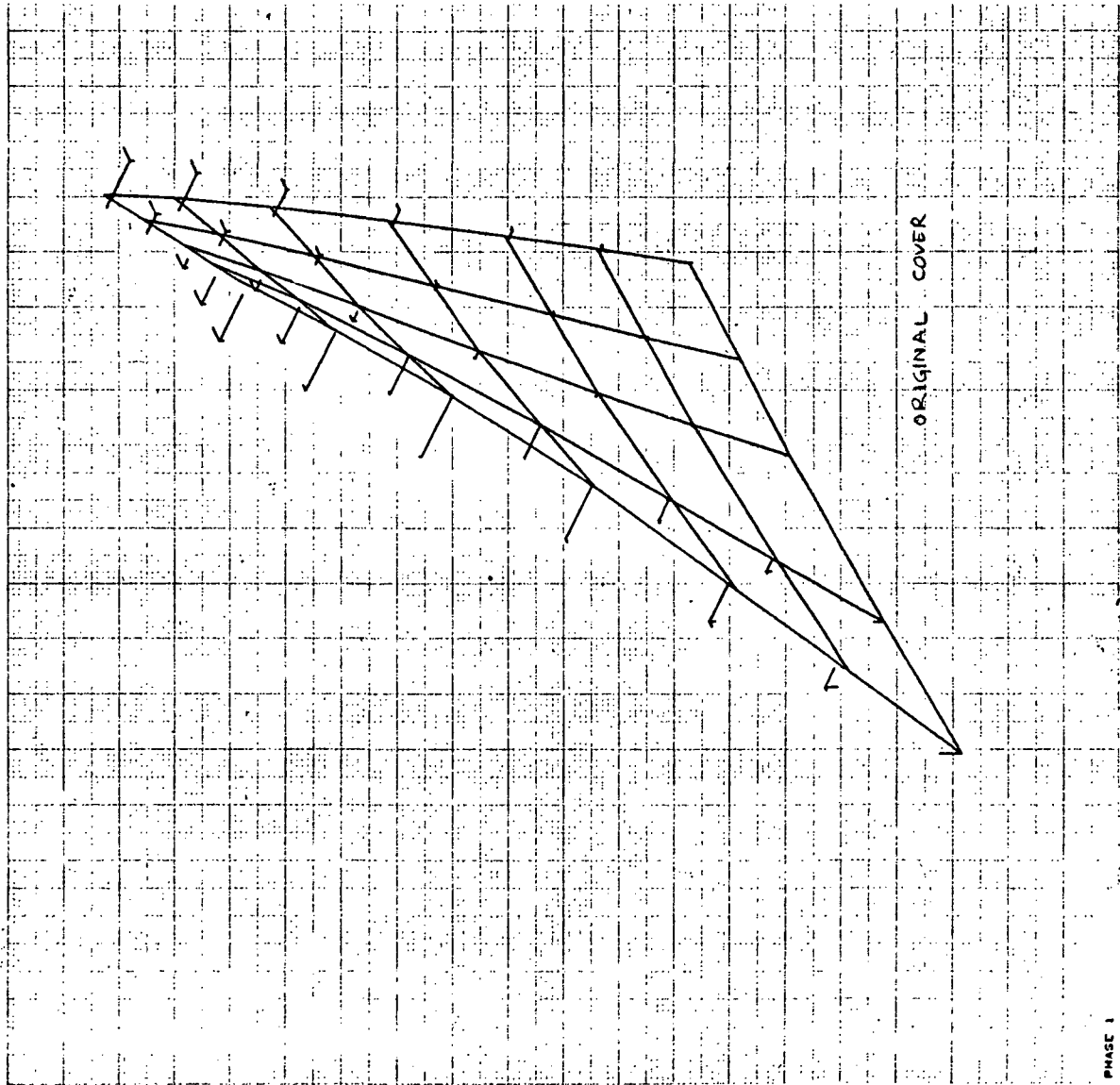
PHASE 1  
ORBITER FIN/ANTI CASE (Ballast decreased by 6 #)  
FREE MODES FIXED AT INTERFACE  
MODAL DEFOR. SUBCASE 1 MODE 1 FREQ. 107.8041

6 8/23/73 MAX-DEF. = 1.00000000



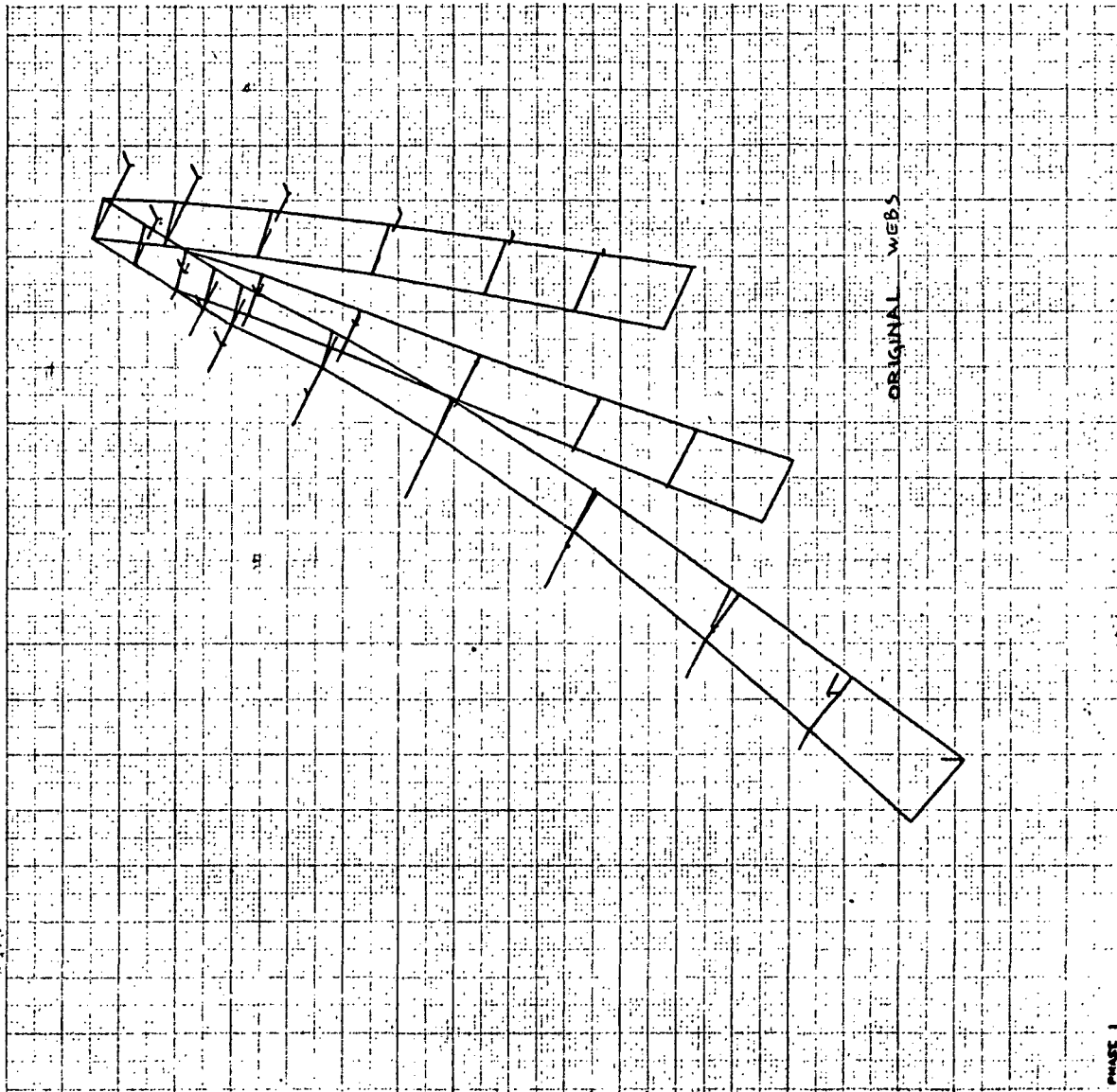
PHASE 1  
ORBITER FIN/ANTI CASE (Ballast decreased to 6\*)  
FREE MODES FIXED AT INTERFACE  
MODAL DEFOR. SUBCASE 1 MODE 1 FREQ. 107.9041

2 6/23/73 MAX-DEF. • 1.11782580



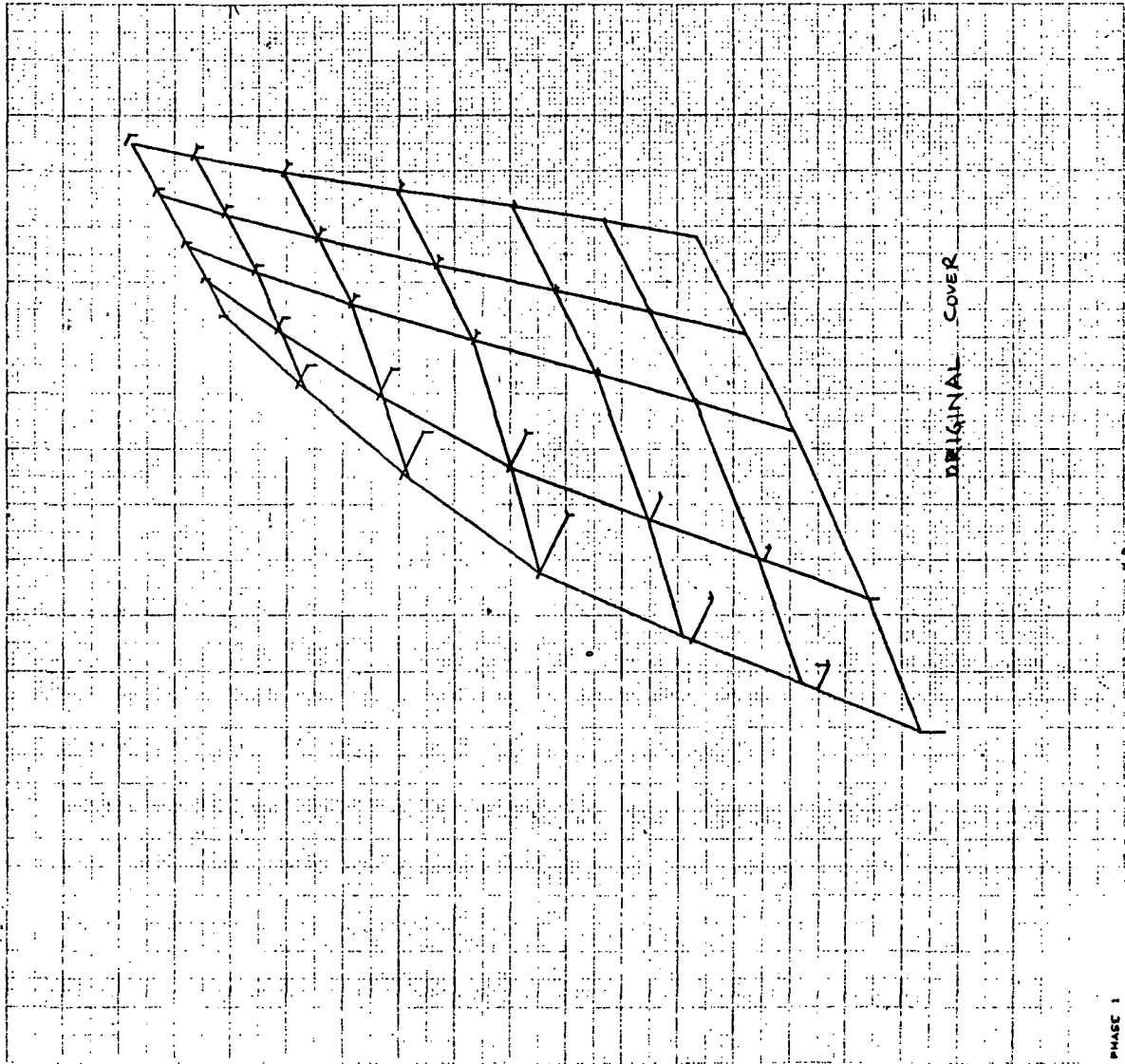
PHASE 1  
ORBITER FIN/ANTI CASE (Ballast decreased by 6#)  
FREE MODES FIXED AT INTERFACE  
MODAL DEFOR. SUBCASE 2 MODE 2 FREQ. 407.2120

6 9/23/73 MAX-DET. = 1.11762650



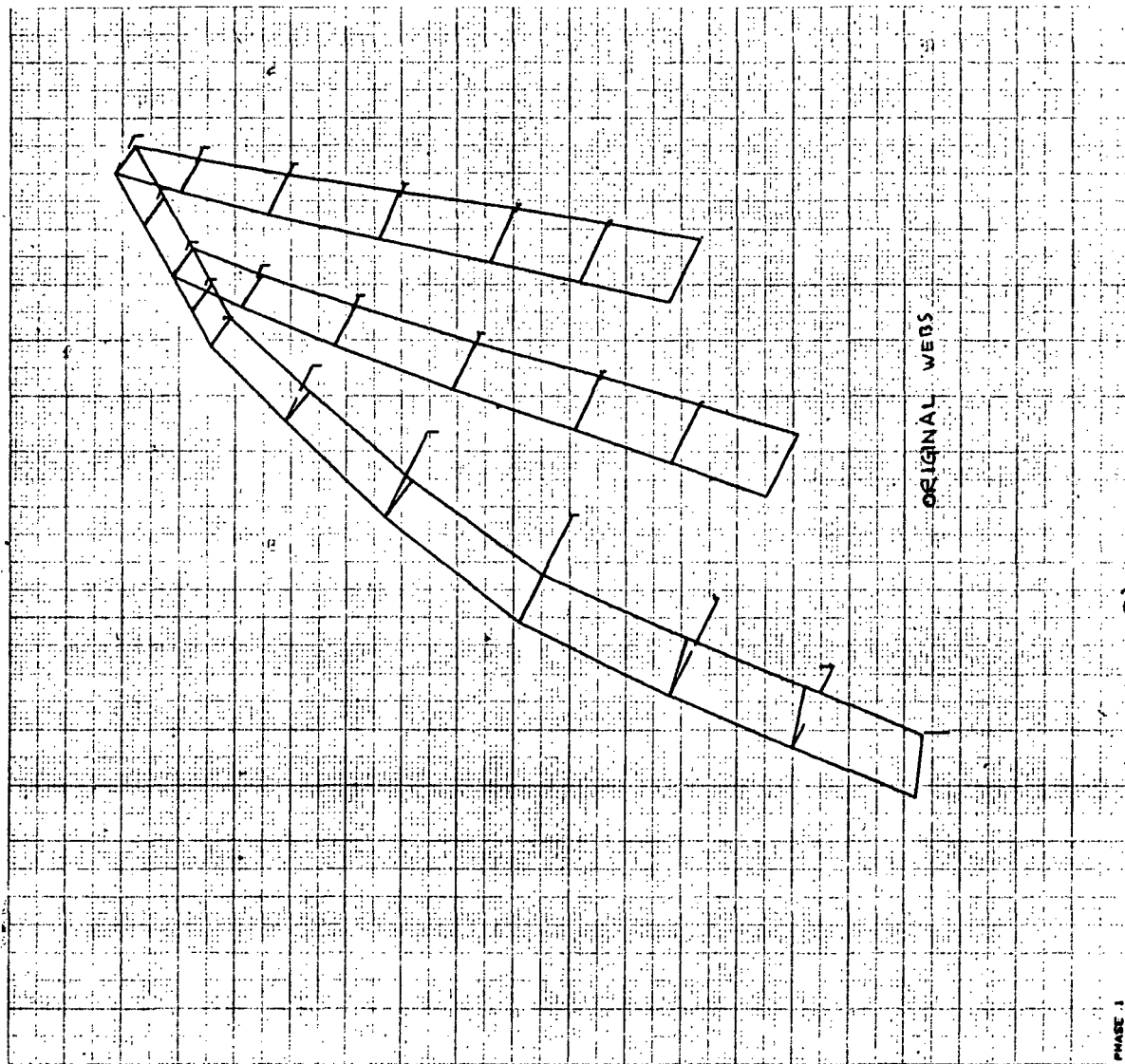
PHASE 1  
ORBITER FIN. ANTI CASE (Bullet decreased to 6.4)  
FREE MODES FIXED AT INTERFACE  
MODAL DETOR. SUBCASE 2 MODE 2 FREQ. 407.2120

9 9/23/73 MAX-DEF. = 1.00000000



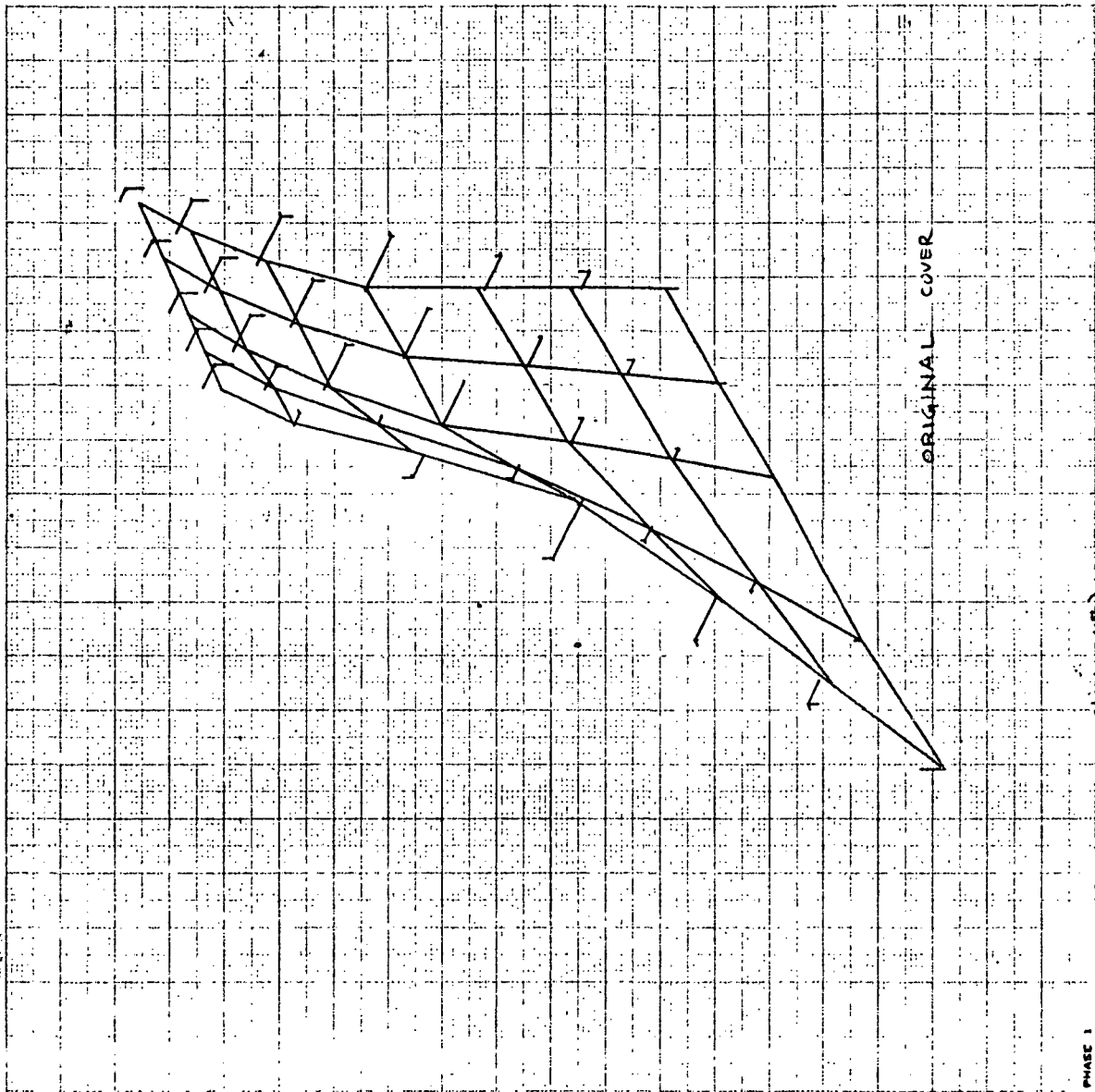
PHASE 1  
 ORBITER FIN. ANT. CASE (Ballast decreased to 6 in.)  
 FREE MODES FIXED AT INTERFACE  
 MODAL DEFOR. SUBCASE 3 MODE 3 FREQ. 1018.128

9/23/73 MAX-DEF. = 1.0000000



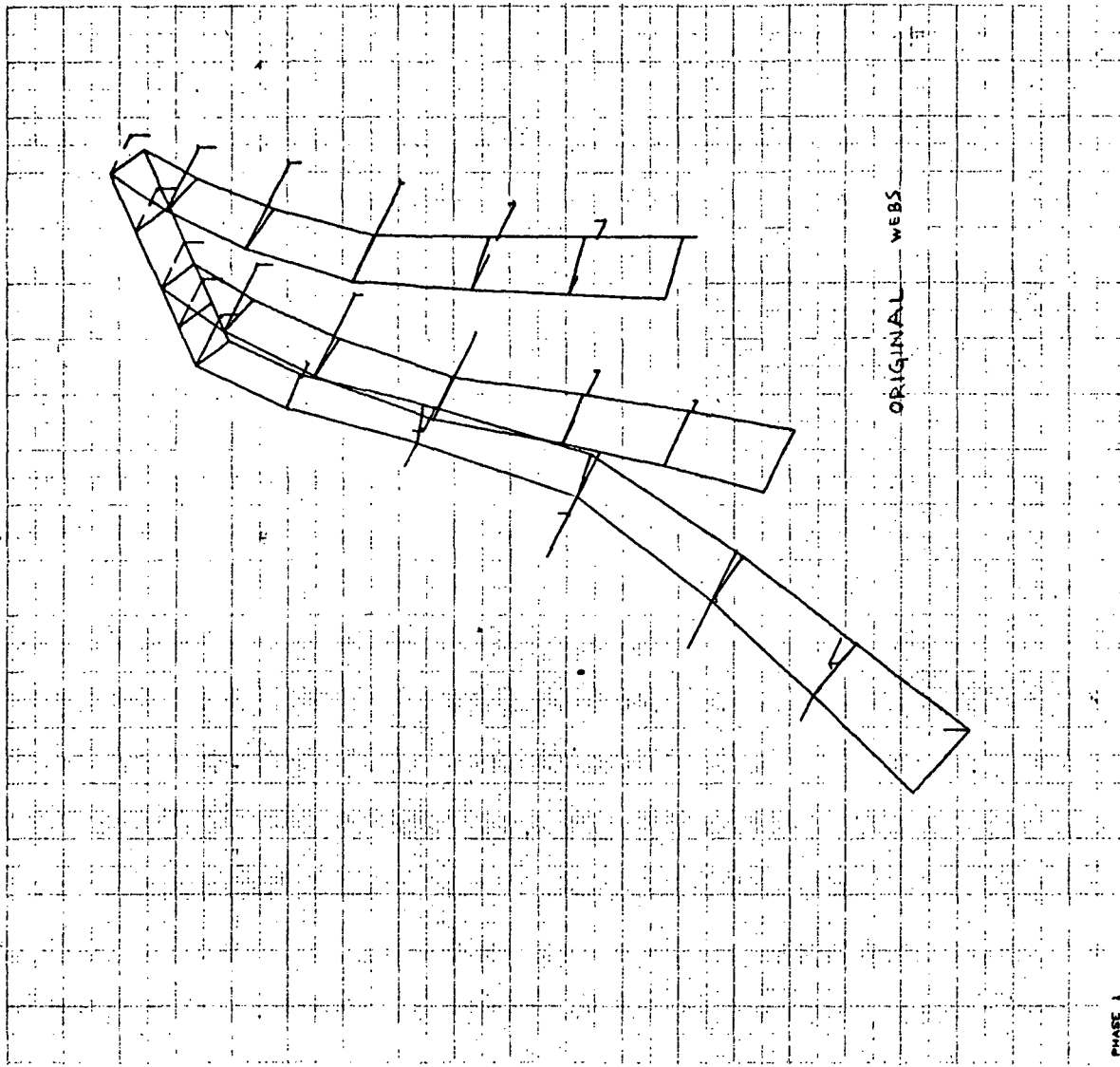
PHASE 1  
ORBITER FIN/ANTI CASE (BALLAST DEFORMED TO 6E)  
FREE MODES FIXED AT INTERFACE  
MODAL DEFORM. SUBCASE 3 MODE 3 FREQ. 1019.728

4 6/23/73 MAX-DEF. = 1.00000000



PHASE 1  
ORBITER FIN/ANTI CASE (Ballast decreased to 6#)  
FREE MODES FIXED AT INTERFACE  
MODAL DEFOR. SUBCASE 4 MODE 4 FREQ. 1510.422





PHASE 1  
ORBITER FIN/ANTI CASE (Ballast released to #)  
FREE MODES FIXED AT INTERFACE  
MODAL DEFOR. SURFACE 4 MODE 4 FREQ. 1810.422

**Appendix B16**  
**SORTED BULK DATA**  
**PHASE 1 ANALYSIS: MODEL I PAYLOAD**

PHASE 1  
ORBITER PAYLOAD, SYMM CASE

CASE CONTROL DECK FCHU

CARD COUNT	
1	TITLE # PHASE 1
2	SUBTITLE # ORBITER PAYLOAD, SYMM CASE
3	ICHO # BOTH
4	MPC # 4891
5	SPC # 4881
6	METHOD # 1
7	SUBCASE 1
8	LABEL # FREE MODES FIXED AT INTERFACE
9	MODES # 4
10	OUTPUT
11	VECTOR # ALL
12	OUTPUT%PLOT#
13	SET 1 # ALL
14	PLOTTER CALCOMP 765,105
15	AXES #MY,X,Z
16	MAXIMUM DEFORMATION 4.0
17	FIND SCALE,ORIGIN 1,SET 1
18	PLOT MODAL DEFORMATION 0 THRU 4,SET 1,SHAPE,VECTOR XYZ
19	BEGIN BULK

PHASE 1

ORBITER PAYLOAD.SYMM CASE

SORTED BULK DATA ECHO

CARD

COUNT	1	2	3	4	5	6	7	8	9	10
1- CBAR	4882	4882	4882	4883	.0	1.0	.0	1		
2- CBAR	4883	4882	4883	4884	.0	1.0	.0	1		
3- CBAR	4884	4882	4884	4885	.0	1.0	.0	1		
4- CBAR	4885	4882	4885	4886	.0	1.0	.0	1		
5- CBAR	4886	4882	4886	4887	.0	1.0	.0	1		
6- CBAR	4887	4882	4887	4888	.0	1.0	.0	1		
7- CBAR	4888	4882	4888	4889	.0	1.0	.0	1		
8- CBAR	4889	4882	4889	4890	.0	1.0	.0	1		
9- CONM2	14881	4881	0	.24						
10- CONM2	14882	4882	0	.74						CM4882
11- CM4882	25.13									
12- CONM2	14883	4883	0	.0						CM4883
13- CM4883	40.85									
14- CONM2	14884	4884	0	.0						CM4884
15- CM4884	40.85									
16- CONM2	14885	4885	0	.0						CM4885
17- CM4885	44.08									
18- CONM2	14886	4886	0	.0						CM4886
19- CM4886	40.85									
20- CONM2	14887	4887	0	.0						CM4887
21- CM4887	37.63									
22- CONM2	14888	4888	0	.0						CM4888
23- CM4888	38.16									
24- CONM2	14889	4889	0	.0						CM4889
25- CM4889	36.28									
26- CONM2	14890	4890	0	1.47						CM4890
27- CM4890	23.24									
28- CONM2	14891	4891	0	.17						
29- CONM2	14892	4892	0	1.24						
30- DMI	CPAJC	0	2	1	2		24	1		
31- DMI	CPAJC	1	1	1.0	23	1.0	1.0			
32- DMI	EQR	0	2	1	2		3	3		
33- DMI	EQR	1	2	1.0	-78.0					
34- DMI	EQR	2	2	1.0	-151.875					
35- DMI	EQR	3	1	1.0	3	51.5				
36- EIGR	1	GIV				4		1.0-4	SEIG1	
37- SEIG1	MAX									
38- GRID	4881	0	78.0	.0	51.933	0	456			
39- GRID	4882	0	78.0	.0	62.5	0				
40- GRID	4883	0	87.5	.0	62.5	0				
41- GRID	4884	0	97.0	.0	62.5	0				
42- GRID	4885	0	106.5	.0	62.5	0				
43- GRID	4886	0	117.5	.0	62.5	0				
44- GRID	4887	0	125.5	.0	62.5	0				
45- GRID	4888	0	135.0	.0	62.5	0				
46- GRID	4889	0	143.25	.0	62.5	0				
47- GRID	4890	0	151.875	.0	62.5	0				
48- GRID	4891	0	151.875	-10.125	56.7	0	456			
49- GRID	4892	0	151.875	.0	51.5	0	456			
50- MAT1	4882	10.566	.3	.1						

## PHASE 1

ORBITER PAYLOAD.SYMM CASE

## SORTED BULK DATA ECHO

## CARD

COUNT	1	2	3	4	5	6	7	8	9	10
51- MPC	4891	4881	1		1.0	4882	1	-1.0		CM4881FX
52- CM4881FX		4882	5		10.567					
53- MPC	4891	4882	3		1.0	4881	3	-1.0		
54- MPC	4891	4889	1		1.0	4890	1	-1.0		
55- MPC	4891	4889	3		1.0	4890	1	-.78409		CM4889FZ
56- CM4889FZ		4891	3		-1.0	4892	1	.78409		
57- MPC	4891	4889	5		1.0	4890	1	-.09091		CM4889MY
58- CM4889MY		4892	1		.09091					
59- MPC	4891	4890	3		1.0	4891	3	-1.0		
60- MPC	4891	4890	5		1.0	4890	1	-.09091		CM4890MY
61- CM4890MY		4892	1		.09091					
62- MPC	4891	4891	1		1.0	4890	1	-.47273		CM4891FX
63- CM4891FX		4892	1		-.52727					
64- MPC	4891	4891	2		1.0	4892	2	-.52727		CM4891FY
65- CM4891FY		4890	2		-.47273					
66- MPC	4891	4892	3		1.0	4891	3	-1.0		
67- PARAM	COUPMASS1									
68- PARAM	GRDPNT	0								
69- PARAM	RMODE	1								
70- PARAM	TPCOPY	1								
71- PARAM	TPNAME	PAYSP1								
72- PARAM	WTMASS	.002588								
73- PBAR	4882	4882	5.775		21.87	23.23	31.00	.245		
74- PLOTEL	4891	4881	4882							
75- PLOTEL	4892	4889	4892							
76- PLOTEL	4893	4890	4892							
77- PLOTEL	4894	4890	4891							
78- SPC	4881	4881	2			4892	2			
79- SPC1	4881	246	4882		THRU	4890				
80- SUPORT	4881	3	4891	3		4892	1			
ENDDATA										

PHASE 1  
ORBITER PAYLOAD, ANTI CASE

CASE CONTROL DECK ECHO

CARD  
COUNT

1 TITLE = PHASE 1  
2 SUBTITLE = ORBITER PAYLOAD, ANTI CASE  
3 ECHO = BOTH  
4 MPC = 4892  
5 SPC = 4882  
6 METHOD = 1  
7 SUBCASE 1  
8 LABEL = FREE MODES FIXED AT INTERFACE  
9 MODES = 4  
10 OUTPUT  
11 VECTOR = ALL  
12 OUTPUT(PLOT)  
13 SET 1 = ALL  
14 PLOTTER CALCOMP 765.105  
15 AXES = V, X, Z  
16 MAXIMUM DEFORMATION 4.0  
17 FIND SCALE, ORIGIN 1, SET 1  
18 PLOT MODAL DEFORMATION 0 THRU 4, SET 1, SHAPE, VECTOR XYZ  
19 BEGIN BULK

PHASE 1  
ORBITER PAYLOAD, ANTI CASE

SORTED BULK DATA ECHO

CARD COUNT	1	2	3	4	5	6	7	8	9	10
1- CBA2	4882	4882	4882	4883	.0	1.0	.0	1		
2- CBA2	4883	4882	4883	4884	.0	1.0	.0	1		
3- CBA2	4884	4882	4884	4885	.0	1.0	.0	1		
4- CBA2	4885	4882	4885	4886	.0	1.0	.0	1		
5- CBA2	4886	4882	4886	4887	.0	1.0	.0	1		
6- CBA2	4887	4882	4887	4888	.0	1.0	.0	1		
7- CBA2	4888	4882	4888	4889	.0	1.0	.0	1		
8- CBA2	4889	4882	4889	4890	.0	1.0	.0	1		
9- C2M2	14881	4881	0	.24						
10- C2M2	14882	4882	0	.74						CM4882
11- CM4882	25.13									
12- C2M2	14883	4883	0	.0						CM4883
13- CM4883	40.85									
14- C2M2	14884	4884	0	.0						CM4884
15- CM4884	40.85									
16- C2M2	14885	4885	0	.0						CM4885
17- CM4885	44.08									
18- C2M2	14886	4886	0	.0						CM4886
19- CM4886	40.85									
20- C2M2	14887	4887	0	.0						CM4887
21- CM4887	37.63									
22- C2M2	14888	4888	0	.0						CM4888
23- CM4888	38.16									
24- C2M2	14889	4889	0	.0						CM4889
25- CM4889	36.28									
26- C2M2	14890	4890	0	1.47						CM4890
27- CM4890	23.24									
28- C2M2	14891	4891	0	.17						
29- C2M2	14892	4892	0	1.24						
30- DMI	CPAJC	0	2	1	2		26	1		
31- DMI	CPAJC	1	1	1.0	25	1.0	1.0			
32- DMI	EOR	0	2	1	2		3	3		
33- DMI	EOR	1	1	1.0	-51.933	78.0				
34- DMI	EOR	2	2	-10.125						
35- DMI	EOR	3	1	1.0	-51.5	151.875				
36- EIGR	1	GIV				4		1.0-4	CEIG1	
37- CEIG1	MAX									
38- GR ID	4881	0	78.0	.0	51.933	0	456			
39- GR ID	4882	0	78.0	.0	62.5	0				
40- GR ID	4883	0	87.5	.0	52.5	0				
41- GR ID	4884	0	97.0	.0	62.5	0				
42- GR ID	4885	0	106.5	.0	62.5	0				
43- GR ID	4886	0	117.5	.0	62.5	0				
44- GR ID	4887	0	125.5	.0	62.5	0				
45- GR ID	4888	0	135.0	.0	62.5	0				
46- GR ID	4889	0	143.25	.0	62.5	0				
47- GR ID	4890	0	151.875	.0	62.5	0				
48- GR ID	4891	0	151.875	-10.125	56.7	0	456			
49- GR ID	4892	0	151.875	.0	51.5	0	456			
50- MAT1	4882	10.566		.3	.1					

PHASE 1  
ORBITER PAYLOAD, ANT I CASE

SORTED BULK DATA ECHO

CARD	COUNT	1	2	3	4	5	6	7	8	9	10
51- MPC		4892	4882	4	1.0	4891	2		-0.09463		EM4882MX
52- EM4882MX			4882	2	.09453						
53- MPC		4892	4889	4	1.0	4891	3		.09877		
54- MPC		4892	4890	2	1.0	4891	3		-1.08642		EM4890FY
55- EM4890FY			4892	2	-1.0						
56- MPC		4892	4890	4	1.0	4891	3		.09877		
57- MPC		4892	4891	1	1.0	4890	1		-1.0		EM4891FX
58- EM4891FX			4890	6	-10.125						
59- MPC		4892	4891	2	1.0	4891	3		-0.51358		EM4891FY
60- EM4891FY			4892	2	-1.0						
61- PARAM		COUPMASS1									
62- PARAM		GRDPNT 0									
63- PARAM		RMODE 1									
64- PARAM		TPCOPY 1									
65- PARAM		TPNAME PAYAPI									
66- PARAM		WTMASS .002588									
67- PBAR		4882	4882	5.775	21.87	23.23	31.00	.245			
68- PLJTEL		4891	4881	4882							
69- PLOTTEL		4892	4889	4892							
70- PLJTEL		4893	4890	4892							
71- PLJTEL		4894	4890	4891							
72- SPC		4882	4881	13		4892	13				
73- SPC1		4882	135	4882	THRU	4890					
74- SUPJRT		4881	2	4891	3	4892	2				
ENDDATA											



**Appendix B18**  
**SORTED BULK DATA**  
**PHASE 2 ANALYSIS: MODEL I ORBITER**

PHASE 2 SYMM CASE  
ORIGINAL ORBITER

CASE CONTROL DECK ECHO

CARD COUNT	
1	TITLE # PHASE 2 SYMM CASE
2	SUBTITLE # ORIGINAL ORBITER
3	SPC # 11
4	MPC # 21
5	METHOD # 1
6	BEGIN BULK

PHASE 2 SYMM CASE  
ORIGINAL ORBITER

C O R D I N A T E D P O I N T D A T A T A B L E

CARD	COUNT	1	2	3	4	5	6	7	8	9	10
1-	ASE T1	1	1516	1606	1800						
2-	ASE T1	1	4890								
3-	ASE T1	3	506	1701							
4-	ASE T1	3	1505	1506	1613	1614					
5-	ASE T1	3	1801								
6-	ASE T1	3	3624								
7-	ASE T1	13	101	201	301	501	601	701	801		
8-	ASE T1	13	901	1101	1201	1401	1501	1637	2001		
9-	ASE T1	13	2026	2040	2115						
10-	ASE T1	15	4882								
11-	ASE T1	123	104	110	120	206	230	305	318		
12-	ASE T1	123	505	518	605	618	705	718	805		
13-	ASE T1	123	818	905	923	1105	1115	1123	1205		
14-	ASE T1	123	1212	1220	1305	1312	1405	1410	1418		
15-	ASE T1	123	1605	1610	1618	1705	1710	1718	1806		
16-	ASE T1	123	1812	1824	1838	1905	1918	2005	2014		
17-	ASE T1	123	2030	2041	2114						
18-	ASE T1	123	3017	3018	3021	3022	3113	3114	3209		
19-	ASE T1	123	3210	3213	3214	3217	3218	3221	3222		
20-	ASE T1	123	3305	3306	3401	3402	3405	3406	3409		
21-	ASE T1	123	3410	3413	3414	3417	3418	3421	3422		
22-	ASE T1	123	3601	3602	3605	3606	3609	3610	3613		
23-	ASE T1	123	3614	3617	3618	3621	3622				
24-	ASE T1	123	4431	4435	4439						
25-	ASE T1	135	4400								
26-	ASE T1	135	4883	THRU	4888						
27-	ASE T1	123456	2200								
28-	CORR00	1	4882	4883	1	.000001					
29-	CORR02	1	0	-81.5683.0		35.5985	-80.2278.0		57.5136	6C1	
30-	6C1	68.25	.0	48.432							
31-	CORR02	3001	0	-81.5683.0		35.5985	-80.2278.0		57.5136	6C3001	
32-	6C3001	68.25	.0	48.432							
33-	CORR02	3002	3001	245.7536-16.463111.0003		245.7536-13.75		24.9514	6C3002		
34-	6C3002	300.	-16.463111.0003								
35-	CORR02	4413	0	166.5	-2.0	75.0	166.5	-0.84	87.5	6C4413	
36-	6C4413	200.0	-2.0	75.0							
37-	CORR02	4416	0	176.1253.0		75.0	183.3422.0		87.5	6C4416	
38-	6C4416	200.0	.0	75.0							
39-	DMI	CPAJC	0	2	1	2		1	1		
40-	DMI	CPAJC	1	1	1.0						
41-	DMI	EQR	0	2	1	2		3	3		
42-	DMI	EQR	1	1	.06105	.99813	-65.1656				
43-	DMI	EQR	2	1	.99813	-.06105	55.5034				
44-	DMI	EQR	3	1	.0599307.979779	-159.182					
45-	EIGR	1	INV	.0	180.	12	12		1.-3	6E1G1	
46-	6E1G1	MAX									
47-	GRDSET		0				0	456			
48-	GRID	*101		0		46.7500		.0		615001	
49-	*15001		50.3000	0							
50-	GRID	*104		0		46.7500		-7.4000		615004	

PHASE 2 SYMM CASE  
ORIGINAL ORBITER

SORTED BULK DATA ECHO										
CARD	1	2	3	4	5	6	7	8	9	10
COUNT	..	..	..	..	..	..	..	..	..	..
51-	*15004		50.3000	0						
52-	GRID	*110		0		46.7500		-11.0000		E15010
53-	*15010		53.5286	0						
54-	GRID	*120		0		46.7500		-11.0000		E15020
55-	*15020		59.7917	0						
56-	GRID	*201		0		64.0000		.0		E15050
57-	*15050		48.6500	0						
58-	GRID	*206		0		64.0000		-12.5000		E15055
59-	*15055		48.6500	0						
60-	GRID	*229		0		64.0000		-10.5000		E15078
61-	*15078		62.5000	0						
62-	GRID	*230		0		64.0000		-12.5000		E15079
63-	*15079		62.5000	0						
64-	GRID	*232		0		64.0000		-9.7007		E15081
65-	*15081		66.5181	0						
66-	GRID	*235		0		64.0000		-7.4247		E15084
67-	*15084		69.9247	0						
68-	GRID	*238		0		64.0000		-4.0181		E15087
69-	*15087		72.2007	0						
70-	GRID	*241		0		64.0000		.0		E15090
71-	*15090		73.0000	0						
72-	GRID	*301		0		68.2500		.0		E15092
73-	*15092		48.4320	1						
74-	GRID	*305		0		68.2500		-12.5000		E15096
75-	*15096		48.4320	0						
76-	GRID	*318		0		68.2500		-12.5000		E15109
77-	*15109		62.5000	0						
78-	GRID	*501		0		78.0000		.0		E15115
79-	*15115		47.9330	0						
80-	GRID	*505		0		78.0000		-12.5000		E15119
81-	*15119		47.9330	0						
82-	GRID	*506		0		78.0000		.0		E15120
83-	*15120		51.9330	0						
84-	GRID	*518		0		78.0000		-12.5000		E15132
85-	*15132		62.5000	0						
86-	GRID	*601		0		87.5000		.0		E15133
87-	*15133		47.4460	0						
88-	GRID	*605		0		87.5000		-12.5000		E15137
89-	*15137		47.4460	0						
90-	GRID	*618		0		87.5000		-12.5000		E15150
91-	*15150		62.5000	0						
92-	GRID	*701		0		97.0000		.0		E15151
93-	*15151		46.9600	0						
94-	GRID	*705		0		97.0000		-12.5000		E15155
95-	*15155		46.9600	0						
96-	GRID	*718		0		97.0000		-12.5000		E15168
97-	*15168		62.5000	0						
98-	GRID	*760		0		102.1200		-12.5000		E15178
99-	*15178		62.5000	0						
100-	GRID	*801		0		106.5000		.0		E15179

PHASE 2 SYMM CASE  
ORIGINAL ORBITER

S O R T E D B U L K D A T A E C H O											
CARD	COUNT	1	2	3	4	5	6	7	8	9	10
101-	*15179			46.4730	0						
102-	GRID	*805			0		106.5000		-12.5000		615183
103-	*15183			46.4730	0						
104-	GRID	*818			0		106.5000		-12.5000		615196
105-	*15196			62.5000	0						
106-	GRID	*901			0		116.0000		.0		615197
107-	*15197			45.9860	0						
108-	GRID	*905			0		116.0000		-12.5000		615201
109-	*15201			45.9860	0						
110-	GRID	*911			0		116.0000		.0		615203
111-	*15203			51.5000	0						
112-	GRID	*918			0		116.0000		-9.2480		615210
113-	*15210			56.7000	0						
114-	GRID	*919			0		116.0000		-12.5000		615211
115-	*15211			56.7000	0						
116-	GRID	*923			0		116.0000		-12.5000		615215
117-	*15215			62.5000	0						
118-	GRID	*1011			0		119.0000		.0		615222
119-	*15222			51.5000	0						
120-	GRID	*1018			0		119.0000		-9.2480		615229
121-	*15229			56.7000	0						
122-	GRID	*1019			0		119.0000		-12.5000		615230
123-	*15230			56.7000	0						
124-	GRID	*1101			0		125.5000		.0		615235
125-	*15235			45.5000	0						
126-	GRID	*1105			0		125.5000		-12.5000		615239
127-	*15239			45.5000	0						
128-	GRID	*1111			0		125.5000		.0		615242
129-	*15242			51.5000	0						
130-	GRID	*1115			0		125.5000		-12.5000		615246
131-	*15246			51.5000	0						
132-	GRID	*1123			0		125.5000		-12.5000		615254
133-	*15254			62.5000	0						
134-	GRID	*1155			0		129.0000		-12.5000		615259
135-	*15259			45.5000	0						
136-	GRID	*1157			0		129.0000		-12.5000		615261
137-	*15261			51.5000	0						
138-	GRID	*1161			0		129.0000		-12.5000		615265
139-	*15265			62.5000	0						
140-	GRID	*1201			0		135.0000		.0		615267
141-	*15267			45.5000	0						
142-	GRID	*1205			0		135.0000		-12.5000		615271
143-	*15271			45.5000	0						
144-	GRID	*1212			0		135.0000		-12.5000		615278
145-	*15278			51.5000	0						
146-	GRID	*1220			0		135.0000		-12.5000		615286
147-	*15286			62.5000	0						
148-	GRID	*1305			0		141.7500		-12.5000		615292
149-	*15292			45.5000	0						
150-	GRID	*1312			0		141.7500		-12.5000		615299

PHASE 2 SYMM CASE  
ORIGINAL ORBITER

SORTED BULK DATA ECHO											
CARD	COUNT	1	2	3	4	5	6	7	8	9	10
151-	*15299			51.5000	0						
152-	GRID	*1315			0		141.7500		-9.2480		E15302
153-	*15302			56.7000	0						
154-	GRID	*1316			0		141.7500		-12.5000		E15303
155-	*15303			56.7000	0						
156-	GRID	*1321			0		141.7500		.0		E15308
157-	*15308			51.5000	0						
158-	GRID	*1401			0		144.7500		.0		E15309
159-	*15309			45.5000	0						
160-	GRID	*1405			0		144.7500		-12.5000		E15313
161-	*15313			45.5000	0						
162-	GRID	*1406			0		144.7500		.0000		E15314
163-	*15314			51.5000	0						
164-	GRID	*1410			0		144.7500		-12.5000		E15318
165-	*15318			51.5000	0						
166-	GRID	*1413			0		144.7500		-9.2480		E15321
167-	*15321			56.7000	0						
168-	GRID	*1414			0		144.7500		-12.5000		E15322
169-	*15322			56.7000	0						
170-	GRID	*1418			0		144.7500		-12.5000		E15326
171-	*15326			62.5000	0						
172-	GRID	*1502			0		150.3750		-12.5000		E15329
173-	*15329			51.5000	0						
174-	GRID	*1505			0		150.3750		-9.2480		E15332
175-	*15332			56.7000	0						
176-	GRID	*1506			0		150.3750		-12.5000		E15333
177-	*15333			56.7000	0						
178-	GRID	*1515			0		150.3750		-12.5000		E15342
179-	*15342			45.5000	0						
180-	GRID	*1516			0		150.3750		.0		E15343
181-	*15343			51.5000	0						
182-	GRID	*1601			0		153.3750		-0.0000		E15347
183-	*15347			45.5000	0						
184-	GRID	*1605			0		153.3750		-12.5000		E15351
185-	*15351			45.5000	0						
186-	GRID	*1606			0		153.3750		-0.0000		E15352
187-	*15352			51.5000	0						
188-	GRID	*1610			0		153.3750		-12.5000		E15356
189-	*15356			51.5000	0						
190-	GRID	*1613			0		153.3750		-9.2480		E15359
191-	*15359			56.7000	0						
192-	GRID	*1614			0		153.3750		-12.5000		E15360
193-	*15360			56.7000	0						
194-	GRID	*1618			0		153.3750		-12.5000		E15364
195-	*15364			62.5000	0						
196-	GRID	*1655			0		157.6875		-12.5000		E15371
197-	*15371			45.5000	0						
198-	GRID	*1656			0		157.6875		-12.5000		E15372
199-	*15372			51.5000	0						
200-	GRID	*1701			0		162.0000		.0000		E15382

PHASE 2 SYMM CASE  
ORIGINAL ORBITER

SORTED BULK DATA ECHO

CARD

CARD	COUNT	1	2	3	4	5	6	7	8	9	10
201-	*15382			45.5000	0						
202-	GRID	*1705			0		162.0000		-12.5000		E15386
203-	*15386			45.5000	0						
204-	GRID	*1710			0		162.0000		-12.5000		E15391
205-	*15391			51.5000	0						
206-	GRID	*1718			0		162.0000		-12.5000		E15399
207-	*15399			62.5000	0						
208-	GRID	*1724			0		165.2500		.0		E15404
209-	*15404			51.5000	0						
210-	GRID	1800		0	165.25	.0	45.5	1			
211-	GRID	*1801			0		166.5000		.0		E15406
212-	*15406			45.5000	0						
213-	GRID	*1802			0		166.5000		-1.7051		E15407
214-	*15407			45.5000	0						
215-	GRID	*1806			0		166.5000		-12.5000		E15411
216-	*15411			45.5000	0						
217-	GRID	*1812			0		166.5000		-12.5000		E15417
218-	*15417			51.5000	0						
219-	GRID	*1823			0		166.5000		-10.5000		E15427
220-	*15427			62.5000	0						
221-	GRID	*1824			0		166.5000		-12.5000		E15428
222-	*15428			62.5000	0						
223-	GRID	*1827			0		166.5000		-9.7007		E15431
224-	*15431			66.5181	0						
225-	GRID	*1828			0		166.5000		-11.5485		E15432
226-	*15432			67.2835	0						
227-	GRID	*1831			0		166.5000		-7.4247		E15435
228-	*15435			69.9247	0						
229-	GRID	*1832			0		166.5000		-8.8389		E15436
230-	*15436			71.3389	0						
231-	GRID	*1833			0		166.5000		.0		E15437
232-	*15437			73.0000	0						
233-	GRID	*1835			0		166.5000		-4.0181		E15439
234-	*15439			72.2007	0						
235-	GRID	*1837			0		166.5000		.0		E15441
236-	*15441			75.0000	0						
237-	GRID	*1838			0		166.5000		-2.0000		E15442
238-	*15442			75.0000	0						
239-	GRID	*1905			0		170.7500		-12.5000		E15448
240-	*15448			45.5000	0						
241-	GRID	*1918			0		170.7500		-12.5000		E15461
242-	*15461			51.5000	0						
243-	GRID	*1926			0		170.7500		-2.0000		E15469
244-	*15469			75.0000	0						
245-	GRID	*2001			0		180.0090		.0		E15480
246-	*15480			45.5000	0						
247-	GRID	*2005			0		180.0090		-12.5000		E15484
248-	*15484			45.5000	0						
249-	GRID	*2014			0		178.8910		-6.4000		E15493
250-	*15493			53.9960	0						

PHASE 2 SYMM CASE  
ORIGINAL ORBITER

CARD		SORTED BULK DATA ECHO									
COUNT	1	2	3	4	5	6	7	8	9	10	
251-	GRID	*2026	0			177.4520		.0		615505	
252-	*15505		64.9220	0							
253-	GRID	*2030	0			177.4520		-12.5000		615509	
254-	*15509		64.9220	0							
255-	GRID	*2035	0			177.1410		-11.5485		615514	
256-	*15514		67.2835	0							
257-	GRID	*2039	0			176.6070		-8.8389		615518	
258-	*15518		71.3389	0							
259-	GRID	*2040	0			176.1250		.0		615519	
260-	*15519		75.0000	0							
261-	GRID	*2041	0			176.1250		-2.0000		615520	
262-	*15520		75.0000	0							
263-	GRID	*2114	0			182.3660		-2.0000		615535	
264-	*15535		75.0000	0							
265-	GRID	*2115	0			182.3660		.0		615536	
266-	*15536		75.0000	0							
267-	GRID	2200	0	171.687	-11.960670.4918	0	0				
268-	GRID	3017		162.0	-61.58	51.5					
269-	GRID	3018		162.0	-61.58	49.0					
270-	GRID	3021		170.75	-61.58	51.5					
271-	GRID	3022		170.75	-61.58	49.0					
272-	GRID	3113		153.375	-54.046751.5						
273-	GRID	3114		153.375	-54.046748.4487						
274-	GRID	3209		144.75	-46.513451.5						
275-	GRID	3210		144.75	-46.513447.8975						
276-	GRID	3213		153.375	-46.513451.5						
277-	GRID	3214		153.375	-46.513447.8975						
278-	GRID	3217		162.0	-46.513451.5						
279-	GRID	3218		162.0	-46.513447.8975						
280-	GRID	3221		170.75	-46.513451.5						
281-	GRID	3222		170.75	-46.513447.8975						
282-	GRID	3305		135.0	-37.997551.5						
283-	GRID	3306		135.0	-37.997547.2743						
284-	GRID	3401		125.5	-29.7	51.5					
285-	GRID	3402		125.5	-29.7	46.6672					
286-	GRID	3405		135.0	-29.7	51.5					
287-	GRID	3406		135.0	-29.7	46.6672					
288-	GRID	3409		144.75	-29.7	51.5					
289-	GRID	3410		144.75	-29.7	46.6672					
290-	GRID	3413		153.375	-29.7	51.5					
291-	GRID	3414		153.375	-29.7	46.6672					
292-	GRID	3417		162.0	-29.7	51.5					
293-	GRID	3418		162.0	-29.7	46.6672					
294-	GRID	3421		170.75	-29.7	51.5					
295-	GRID	3422		170.75	-29.7	46.6672					
296-	GRID	3601		125.5	-13.75	51.5					
297-	GRID	3602		125.5	-13.75	45.5					
298-	GRID	3605		135.0	-13.75	51.5					
299-	GRID	3606		135.0	-13.75	45.5					
300-	GRID	3609		144.75	-13.75	51.5					



PHASE 2 SYMM CASE  
ORIGINAL ORBITER

SORTED BULK DATA ECHO										
CARD	1	2	3	4	5	6	7	8	9	10
COUNT										
301- GRID	3610			144.75	-13.75	45.5				
302- GRID	3613			153.375	-13.75	51.5				
303- GRID	3614			153.375	-13.75	45.5				
304- GRID	3617			162.0	-13.75	51.5				
305- GRID	3618			162.0	-13.75	45.5				
306- GRID	3621			170.75	-13.75	51.5				
307- GRID	3622			170.75	-13.75	45.5				
308- GRID	3624	0		165.25	-13.75	45.5	3002	12456		
309- GRID	3651	0		125.5	-12.5	51.5	0	2456		
310- GRID	3652			125.5	-12.5	45.5				
311- GRID	3653	0		129.0	-12.5	51.5	0	2456		
312- GRID	3654			129.0	-12.5	45.5				
313- GRID	3655	0		135.0	-12.5	51.5	0	2456		
314- GRID	3656			135.0	-12.5	45.5				
315- GRID	3657	0		141.75	-12.5	51.5	0	2456		
316- GRID	3658			141.75	-12.5	45.5				
317- GRID	3659			144.75	-12.5	51.5				
318- GRID	3660			144.75	-12.5	45.5				
319- GRID	3661			150.375	-12.5	51.5				
320- GRID	3662			150.375	-12.5	45.5				
321- GRID	3663			153.375	-12.5	51.5				
322- GRID	3664			153.375	-12.5	45.5				
323- GRID	3665			157.6875	-12.5	51.5				
324- GRID	3666			157.6875	-12.5	45.5				
325- GRID	3667			162.0	-12.5	51.5				
326- GRID	3668			162.0	-12.5	45.5				
327- GRID	3669			166.5	-12.5	51.5				
328- GRID	3670			166.5	-12.5	45.5				
329- GRID	3671			170.75	-12.5	51.5				
330- GRID	3672			170.75	-12.5	45.5				
331- GRID	4002	0		64.0	.0	73.0	0	1456		
332- GRID	4004	0		64.0	-4.0181	72.2007	0	1456		
333- GRID	4006	0		64.0	-7.4247	69.9247	0	1456		
334- GRID	4008	0		64.0	-9.7007	66.5181	0	1456		
335- GRID	4010	0		64.0	-10.5	62.5	0	1456		
336- GRID	4029	0		78.0	-12.5	62.5	0	2456		
337- GRID	4069	0		102.12	-12.5	62.5	0	2456		
338- GRID	4119	0		129.0	-12.5	62.5	0	2456		
339- GRID	4149	0		153.375	-12.5	62.5	0	2456		
340- GRID	4172	0		166.5	.0	73.0	0	1456		
341- GRID	4174	0		166.5	-4.0181	72.2007	0	1456		
342- GRID	4176	0		166.5	-7.4247	69.9247	0	1456		
343- GRID	4178	0		166.5	-9.7007	66.5181	0	1456		
344- GRID	4180	0		166.5	-10.5	62.5	0	1456		
345- GRID	4400	0		184.1	.0	88.5	0	0		
346- GRID	4401	0		181.0	-0.84	87.5	0	456		
347- GRID	4405	0		183.3422	-0.84	87.5	0	456		
348- GRID	4409	0		186.8	-0.84	87.5	0	456		
349- GRID	4431	0		174.04	-1.3968	81.5	0	456		
350- GRID	4435	0		179.8781	-1.3968	81.5	0	456		

PHASE 2 SYMM CASE  
ORIGINAL ORBITER

SORTED BULK DATA ECHO

CARD	COUNT	1	2	3	4	5	6	7	8	9	10
351- GRID	4439	0			184.6718	-1.3968	81.5	0	456		
352- GRID	4461	0			166.5	-2.0	75.0	0	3456		
353- GRID	4462	0			166.5	.0	75.0	0	456		
354- GRID	4463	0			170.75	-2.0	75.0	4413	23456		
355- GRID	4465	0			176.1253	-2.0	75.0	0	456		
356- GRID	4466	0			176.1253	.0	75.0	4416	13456		
357- GRID	4467	0			179.2458	-2.0	75.0	4413	23456		
358- GRID	4469	0			182.3663	-2.0	75.0	0	3456		
359- GRID	4470	0			182.3663	.0	75.0	0	456		
360- GRID	4881	0			78.0	.0	51.933	0	456		
361- GRID	4882	0			78.0	.0	62.5	0	0		
362- GRID	4883	0			87.5	.0	62.5	0	0		
363- GRID	4884	0			97.0	.0	62.5	0	0		
364- GRID	4885	0			106.5	.0	62.5	0	0		
365- GRID	4886	0			117.5	.0	62.5	0	0		
366- GRID	4887	0			125.5	.0	62.5	0	0		
367- GRID	4888	0			135.0	.0	62.5	0	0		
368- GRID	4889	0			143.25	.0	62.5	0	0		
369- GRID	4890	0			151.875	.0	62.5	0	0		
370- GRID	4891	0			151.875	-10.125	56.7	0	456		
371- GRID	4892	0			151.875	.0	51.5	0	456		
372- MAT1	1		10.586		.3	.1					
373- MPC	100		1828	1	1.0	2200	1	-1.0		E48	
374- E48			2200	5	3.2063	2200	6	.4121			
375- MPC	100		1828	2	1.0	2200	2	-1.0		E49	
376- E49			2200	4	-3.2083	2200	6	5.187			
377- MPC	100		1828	3	1.0	2200	3	-1.0		E50	
378- E50			2200	4	-4.121	2200	5	-5.187			
379- MPC	100		1832	1	1.0	2200	1	-1.0		E45	
380- E45			2200	5	-0.8471	2200	6	3.1217			
381- MPC	100		1832	2	1.0	2200	2	-1.0		E46	
382- E46			2200	4	.8471	2200	6	5.187			
383- MPC	100		1832	3	1.0	2200	3	-1.0		E47	
384- E47			2200	4	-3.1217	2200	5	-5.187			
385- MPC	100		2035	1	1.0	2200	1	-1.0		E54	
386- E54			2200	5	3.2083	2200	6	.4121			
387- MPC	100		2035	2	1.0	2200	2	-1.0		E55	
388- E55			2200	4	-3.2083	2200	6	-5.454			
389- MPC	100		2035	3	1.0	2200	3	-1.0		E56	
390- E56			2200	4	-4.121	2200	5	5.454			
391- MPC	100		2039	1	1.0	2200	1	-1.0		E51	
392- E51			2200	5	-0.8471	2200	6	3.1217			
393- MPC	100		2039	2	1.0	2200	2	-1.0		E52	
394- E52			2200	4	.8471	2200	6	-4.920			
395- MPC	100		2039	3	1.0	2200	3	-1.0		E53	
396- E53			2200	4	-3.1217	2200	5	4.920			
397- MPC	101		1701	1	1.0	1701	3	-.01699		EM1701XS	
398- EM1701XS			1800	1	-1.001871801		3	-.04417			
399- MPC	101		1801	1	1.0	1701	3	-.01699		EM1801XS	
400- EM1801XS			1800	1	-1.001871801		3	-.04417			

PHASE 2 SYMM CASE  
ORIGINAL ORBITER

SORTED BULK DATA ECHO

CARD	COUNT	1	2	3	4	5	6	7	8	9	10
401-	MPC	101	1802	1	1.0	1701	3		-.01699		EM1802XS
402-	EM1802XS		1800	1	-1.00187	1801	3		-.04417		
403-	MPC	101	1802	3	1.0	1801	3		-1.0		
404-	MPC	102	1801	2	1.0	1800	2		-1.38462		EM1801YA
405-	EM1801YA		1701	2	.38462						
406-	MPC	102	1802	1	1.0	1701	2		.52465		EM1802XA
407-	EM1802XA		1800	2	-.52465						
408-	MPC	102	1802	2	1.0	1800	2		-1.38462		EM1802YA
409-	EM1802YA		1701	2	.38462						
410-	MPC	3010	3651	1	1.0	1115	1		-1.0		
411-	MPC	3010	3651	3	1.0	1115	3		-1.0		
412-	MPC	3010	3652	1	1.0	1105	1		-1.0		
413-	MPC	3010	3652	2	1.0	1105	2		-1.0		
414-	MPC	3010	3652	3	1.0	1105	3		-1.0		
415-	MPC	3010	3653	1	1.0	1157	1		-1.0		
416-	MPC	3010	3653	3	1.0	1157	3		-1.0		
417-	MPC	3010	3654	1	1.0	1155	1		-1.0		
418-	MPC	3010	3654	2	1.0	1155	2		-1.0		
419-	MPC	3010	3654	3	1.0	1155	3		-1.0		
420-	MPC	3010	3655	1	1.0	1212	1		-1.0		
421-	MPC	3010	3655	3	1.0	1212	3		-1.0		
422-	MPC	3010	3656	1	1.0	1205	1		-1.0		
423-	MPC	3010	3656	2	1.0	1205	2		-1.0		
424-	MPC	3010	3656	3	1.0	1205	3		-1.0		
425-	MPC	3010	3657	1	1.0	1312	1		-1.0		
426-	MPC	3010	3657	3	1.0	1312	3		-1.0		
427-	MPC	3010	3658	1	1.0	1305	1		-1.0		
428-	MPC	3010	3658	2	1.0	1305	2		-1.0		
429-	MPC	3010	3658	3	1.0	1305	3		-1.0		
430-	MPC	3010	3659	1	1.0	1410	1		-1.0		
431-	MPC	3010	3659	2	1.0	1410	2		-1.0		
432-	MPC	3010	3659	3	1.0	1410	3		-1.0		
433-	MPC	3010	3660	1	1.0	1405	1		-1.0		
434-	MPC	3010	3660	2	1.0	1405	2		-1.0		
435-	MPC	3010	3660	3	1.0	1405	3		-1.0		
436-	MPC	3010	3661	1	1.0	1502	1		-1.0		
437-	MPC	3010	3661	2	1.0	1502	2		-1.0		
438-	MPC	3010	3661	3	1.0	1502	3		-1.0		
439-	MPC	3010	3662	1	1.0	1515	1		-1.0		
440-	MPC	3010	3662	2	1.0	1515	2		-1.0		
441-	MPC	3010	3662	3	8.625	1405	3		-3.0		EM3662Z
442-	EM3662Z		1605	3	-5.625						
443-	MPC	3010	3663	1	1.0	1610	1		-1.0		
444-	MPC	3010	3663	2	1.0	1610	2		-1.0		
445-	MPC	3010	3663	3	1.0	1610	3		-1.0		
446-	MPC	3010	3664	1	1.0	1605	1		-1.0		
447-	MPC	3010	3664	2	1.0	1605	2		-1.0		
448-	MPC	3010	3664	3	1.0	1605	3		-1.0		
449-	MPC	3010	3665	1	1.0	1656	1		-1.0		
450-	MPC	3010	3665	2	1.0	1656	2		-1.0		

PHASE 2 SYMM CASE  
ORIGINAL ORBITER

SORTED BULK DATA ECHO

CARD	COUNT	1	2	3	4	5	6	7	8	9	10
451- MPC		3010	3665	3		1.0	1656	3	-1.0		
452- MPC		3010	3666	1		1.0	1655	1	-1.0		
453- MPC		3010	3666	2		1.0	1655	2	-1.0		
454- MPC		3010	3666	3		1.625	1605	3	-4.3125		EM3666Z
455- EM3666Z			1705	3		-4.3125					
456- MPC		3010	3667	1		1.0	1710	1	-1.0		
457- MPC		3010	3667	2		1.0	1710	2	-1.0		
458- MPC		3010	3667	3		1.0	1710	3	-1.0		
459- MPC		3010	3668	1		1.0	1705	1	-1.0		
460- MPC		3010	3668	2		1.0	1705	2	-1.0		
461- MPC		3010	3668	3		1.0	1705	3	-1.0		
462- MPC		3010	3669	1		1.0	1812	1	-1.0		
463- MPC		3010	3669	2		1.0	1812	2	-1.0		
464- MPC		3010	3669	3		1.0	1812	3	-1.0		
465- MPC		3010	3670	1		1.0	1806	1	-1.0		
466- MPC		3010	3670	2		1.0	1806	2	-1.0		
467- MPC		3010	3670	3		1.0	1806	3	-1.0		
468- MPC		3010	3671	1		1.0	1918	1	-1.0		
469- MPC		3010	3671	2		1.0	1918	2	-1.0		
470- MPC		3010	3671	3		1.0	1918	3	-1.0		
471- MPC		3010	3672	1		1.0	1905	1	-1.0		
472- MPC		3010	3672	2		1.0	1905	2	-1.0		
473- MPC		3010	3672	3		1.0	1905	3	-1.0		
474- MPC		4010	4004	2		1.0	238	2	-1.0		
475- MPC		4010	4004	3		1.0	238	3	-1.0		
476- MPC		4010	4006	2		1.0	235	2	-1.0		
477- MPC		4010	4006	3		1.0	235	3	-1.0		
478- MPC		4010	4008	2		1.0	232	2	-1.0		
479- MPC		4010	4008	3		1.0	232	3	-1.0		
480- MPC		4010	4010	2		1.0	229	2	-1.0		
481- MPC		4010	4010	3		1.0	229	3	-1.0		
482- MPC		4010	4029	1		1.0	518	1	-1.0		
483- MPC		4010	4029	3		1.0	518	3	-1.0		
484- MPC		4010	4069	1		1.0	760	1	-1.0		
485- MPC		4010	4069	3		1.0	760	3	-1.0		
486- MPC		4010	4119	1		1.0	1161	1	-1.0		
487- MPC		4010	4119	3		1.0	1161	3	-1.0		
488- MPC		4010	4149	1		1.0	1618	1	-1.0		
489- MPC		4010	4149	3		1.0	1618	3	-1.0		
490- MPC		4010	4174	2		1.0	1835	2	-1.0		
491- MPC		4010	4174	3		1.0	1835	3	-1.0		
492- MPC		4010	4176	2		1.0	1831	2	-1.0		
493- MPC		4010	4176	3		1.0	1831	3	-1.0		
494- MPC		4010	4178	2		1.0	1827	2	-1.0		
495- MPC		4010	4178	3		1.0	1827	3	-1.0		
496- MPC		4010	4180	2		1.0	1823	2	-1.0		
497- MPC		4010	4180	3		1.0	1823	3	-1.0		
498- MPC		4011	4002	3		1.0	241	3	-1.0		
499- MPC		4011	4172	3		1.0	1833	3	-1.0		
500- MPC		4012	4002	2		1.0	241	2	-1.0		

PHASE 2 SYMM CASE  
ORIGINAL ORBITER

SORTED BULK DATA ECHO

CARD	COUNT	1	2	3	4	5	6	7	8	9	10
501- MPC		4012	4172	2		1.0	1833	2	-1.0		
502- MPC		4410	4461	1		1.0	1838	1	-1.0		
503- MPC		4410	4461	2		1.0	1838	2	-1.0		
504- MPC		4410	4463	1		1.0	1926	1	-1.0		
505- MPC		4410	4465	1		1.0	2041	1	-1.0		
506- MPC		4410	4465	2		1.0	2041	2	-1.0		
507- MPC		4410	4465	3		1.0	2041	3	-1.0		
508- MPC		4410	4467	1		1.0	2041	1	-0.5		EM4467X
509- EM4467X			2114	1		-0.5					
510- MPC		4410	4469	1		1.0	2114	1	-1.0		
511- MPC		4410	4469	2		1.0	2114	2	-1.0		
512- MPC		4411	4462	1		1.0	1837	1	-1.0		
513- MPC		4411	4462	3		1.0	1837	3	-1.0		
514- MPC		4411	4470	1		1.0	2115	1	-1.0		
515- MPC		4411	4470	3		1.0	2115	3	-1.0		
516- MPC		4412	4462	2		1.0	1837	2	-1.0		
517- MPC		4412	4466	2		1.0	2040	2	-1.0		
518- MPC		4412	4470	2		1.0	2115	2	-1.0		
519- MPC		4450	4401	1		1.0	4400	1	-1.0		EMC4401X
520- EMC4401X			4400	5		1.0	4400	6	-0.84		
521- MPC		4450	4401	2		1.0	4400	2	-1.0		EMC4401Y
522- EMC4401Y			4400	4		-1.0	4400	6	3.1		
523- MPC		4450	4401	3		1.0	4400	3	-1.0		EMC4401Z
524- EMC4401Z			4400	4		.84	4400	5	-3.1		
525- MPC		4450	4405	1		1.0	4400	1	-1.0		EMC4405X
526- EMC4405X			4400	5		1.0	4400	6	-0.84		
527- MPC		4450	4405	2		1.0	4400	2	-1.0		EMC4405Y
528- EMC4405Y			4400	4		-1.0	4400	6	.7578		
529- MPC		4450	4405	3		1.0	4400	3	-1.0		EMC4405Z
530- EMC4405Z			4400	4		.84	4400	5	-0.7578		
531- MPC		4450	4409	1		1.0	4400	1	-1.0		EMC4409X
532- EMC4409X			4400	5		1.0	4400	6	-0.84		
533- MPC		4450	4409	2		1.0	4400	2	-1.0		EMC4409Y
534- EMC4409Y			4400	4		-1.0	4400	6	-2.7000		
535- MPC		4450	4409	3		1.0	4400	3	-1.0		EMC4409Z
536- EMC4409Z			4400	4		.84	4400	5	2.7		
537- MPC		4810	4891	3		1.0	1505	3	-.36516		EM4891ZA
538- EM4891ZA			1506	3		-.13484	1613	3	-.36516		EM4891ZB
539- EM4891ZB			1614	3		-.13484					
540- MPC		4811	4881	3		1.0	506	3	-1.0		
541- MPC		4811	4892	1		1.0	1516	1	-0.5		EM4892X
542- EM4892X			1606	1		-0.5					
543- MPC		4812	4881	2		1.0	506	2	-1.0		
544- MPC		4812	4892	2		1.0	1516	2	-0.5		EM4892Y
545- EM4892Y			1606	2		-0.5					
546- MPC		4891	506	1		1.0	4882	1	-1.0		EM4881FX
547- EM4881FX			4882	5		10.567					
548- MPC		4891	4882	3		1.0	506	3	-1.0		
549- MPC		4891	4889	1		1.0	4890	1	-1.0		
550- MPC		4891	4889	3		1.0	4890	1	-.78409		EM4889ZA

PHASE 2 SYMM CASE  
ORIGINAL ORBITER

SORTED BULK DATA ECHO

CARD	COUNT	1	2	3	4	5	6	7	8	9	10
551-	EM4889ZA		1505	3		-.36516	1506	3	-.13484		EM4889ZB
552-	EM4889ZB		1613	3		-.36516	1614	3	-.13484		EM4889ZC
553-	EM4889ZC		1516	1		.392045	1606	1	.392045		
554-	MPC	4891	4889	5		1.0	4890	1	-.09091		EM4889MY
555-	EM4889MY		1516	1		.045455	1606	1	.045455		
556-	MPC	4891	4890	3		1.0	1505	3	-.36516		EM4890ZA
557-	EM4890ZA		1506	3		-.13484	1613	3	-.36516		EM4890ZB
558-	EM4890ZB		1614	3		-.13484					
559-	MPC	4891	4890	5		1.0	4890	1	-.09091		EM4890MY
560-	EM4890MY		1516	1		.045455	1606	1	.045455		
561-	MPC	4891	4891	1		1.0	4890	1	-.47273		EM4891FX
562-	EM4891FX		1516	1		-.263635	1606	1	-.263635		
563-	MPC	4891	4891	2		1.0	1516	2	-.263635		EM4891FY
564-	EM4891FY		1606	2		-.263635	4890	2	-.47273		
565-	MPC	4891	4892	3		1.0	1505	3	-.36516		EM4892ZA
566-	EM4892ZA		1506	3		-.13484	1613	3	-.36516		EM4892ZB
567-	EM4892ZB		1614	3		-.13484					
568-	MPC	4892	4882	4		1.0	506	2	-.09463		EM4882MX
569-	EM4882MX		4882	2		.09463					
570-	MPC	4892	4889	4		1.0	1505	3	.036067		EM4892MXA
571-	EM4892MXA		1506	3		.013318	1613	3	.036067		EM4892MXB
572-	EM4892MXB		1614	3		.013318					
573-	MPC	4892	4890	2		1.0	1505	3	-.396717		EM4890YA
574-	EM4890YA		1506	3		-.146493	1613	3	-.396717		EM4890YB
575-	EM4890YB		1614	3		-.146493	1516	2	-.5		EM4890YC
576-	EM4890YC		1606	2		-.5					
577-	MPC	4892	4890	4		1.0	1505	3	.036067		EM4890MXA
578-	EM4890MXA		1506	3		.013318	1613	3	.036067		EM4890MXB
579-	EM4890MXB		1614	3		.013318					
580-	MPC	4892	4891	1		1.0	4890	1	-1.0		EM4891FX
581-	EM4891FX		4890	6		-10.125					
582-	MPC	4892	4891	2		1.0	1505	3	-.187539		EM4891YA
583-	EM4891YA		1506	3		-.069251	1613	3	-.187539		EM4891YB
584-	EM4891YB		1614	3		-.069251	1516	2	-.5		EM4891YC
585-	EM4891YC		1606	2		-.5					
586-	MPCADD	21	100	101		3010	4010	4011	4450	4410	EMPCSYM
587-	EMPCSYM	4411	4810	4891		4811					
588-	MPCADD	22	100	102		3010	4010	4012	4450	4410	EMPCANTI
589-	EMPCANTI	4412	4810	4892		4812					
590-	PARAM	NDSUB	6								
591-	PARAM	TPCOPY	1								
592-	PARAM	TPNAME	ORBTSP2								
593-	PARAM	TPNAME9	ORCOUPS								
594-	PLOTTEL	1001	120	230			1002	230	518		
595-	PLOTTEL	1003	518	618			1004	618	718		
596-	PLOTTEL	1005	718	818			1006	818	923		
597-	PLOTTEL	1007	923	1123			1008	1123	1220		
598-	PLOTTEL	1009	1220	1418			1010	1418	1618		
599-	PLOTTEL	1011	1618	1718			1012	1718	1824		
600-	PLOTTEL	1013	1824	2030			1014	1828	2035		

PHASE 2 SYMM CASE  
ORIGINAL ORBITER

SORTED BULK DATA ECHO

CARD	1	2	3	4	5	6	7	8	9	10
COUNT										
601~	PLOTTEL	1015	1832	2039		1016	1838	2041		
602~	PLOTTEL	1017	2041	2114		1018	1837	2040		
603~	PLOTTEL	1019	2040	2115		1020	1115	1212		
604~	PLOTTEL	1021	1212	1312		1022	1312	1410		
605~	PLOTTEL	1023	1410	1610		1024	1610	1710		
606~	PLOTTEL	1025	1710	1812		1026	1812	1918		
607~	PLOTTEL	1027	110	120		1028	206	230		
608~	PLOTTEL	1029	305	318		1030	505	518		
609~	PLOTTEL	1031	605	618		1032	705	718		
610~	PLOTTEL	1033	805	818		1034	905	923		
611~	PLOTTEL	1035	1105	1115		1036	1115	1123		
612~	PLOTTEL	1037	1205	1212		1038	1212	1220		
613~	PLOTTEL	1039	1305	1312		1040	1410	1418		
614~	PLOTTEL	1041	1610	1618		1042	1710	1718		
615~	PLOTTEL	1043	1812	1824		1044	1824	1828		
616~	PLOTTEL	1045	1828	1832		1046	1832	1838		
617~	PLOTTEL	1047	1838	1837		1048	1905	1918		
618~	PLOTTEL	1049	2005	2030		1050	2030	2035		
619~	PLOTTEL	1051	2035	2039		1052	2039	2041		
620~	PLOTTEL	1053	2041	2040		1054	2114	2115		
621~	PLOTTEL	1055	110	206		1056	206	305		
622~	PLOTTEL	1057	305	505		1058	505	605		
623~	PLOTTEL	1059	605	805		1060	805	905		
624~	PLOTTEL	1061	905	1105		1062	1105	1205		
625~	PLOTTEL	1063	1205	1305		1064	1905	2005		
626~	PLOTTEL	1065	101	201		1066	201	301		
627~	PLOTTEL	1067	301	501		1068	501	601		
628~	PLOTTEL	1069	601	701		1070	701	801		
629~	PLOTTEL	1071	801	901		1072	901	1101		
630~	PLOTTEL	1073	1101	1201		1074	1201	1401		
631~	PLOTTEL	1075	1401	1601		1076	1601	1701		
632~	PLOTTEL	1077	1701	1801		1078	1701	1802		
633~	PLOTTEL	1079	1801	2001		1080	1305	1405		
634~	PLOTTEL	1081	1405	1605		1082	1605	1705		
635~	PLOTTEL	1083	1705	1806		1084	1806	1905		
636~	PLOTTEL	1085	101	104		1086	104	110		
637~	PLOTTEL	1087	201	206		1088	301	305		
638~	PLOTTEL	1089	501	505						
639~	PLOTTEL	1091	601	605		1092	701	705		
640~	PLOTTEL	1093	801	805		1094	901	905		
641~	PLOTTEL	1095	1101	1105		1096	1201	1205		
642~	PLOTTEL	1097	1401	1405		1098	1601	1605		
643~	PLOTTEL	1099	1701	1705		1100	1801	1802		
644~	PLOTTEL	1101	1802	1806		1102	2001	2005		
645~	PLOTTEL	1103	2026	2030		1104	2039	2014		
646~	PLOTTEL	1105	2005	2030		1106	2030	2039		
647~	PLOTTEL	2992	3617	3621		3055	3618	3622		
648~	PLOTTEL	2993	3613	3617		3054	3614	3618		
649~	PLOTTEL	2994	3609	3613		3053	3610	3614		
650~	PLOTTEL	2995	3605	3609		3052	3606	3610		

PHASE 2 SYMM CASE  
ORIGINAL ORBITER

S O R T E D   B U L K   D A T A   E C H O										
CARD										
COUNT	1	2	3	4	5	6	7	8	9	10
651- PLOTTEL	2996	3601	3605			3051	3602	3606		
652- PLOTTEL	2997	3421	3621			3050	3422	3622		
653- PLOTTEL	2998	3417	3617			3049	3418	3618		
654- PLOTTEL	2999	3413	3613			3048	3414	3614		
655- PLOTTEL	3000	3409	3609			3047	3410	3610		
656- PLOTTEL	3001	3017	3021			3024	3018	3022		
657- PLOTTEL	3002	3017	3113			3025	3018	3114		
658- PLOTTEL	3003	3113	3209			3026	3114	3210		
659- PLOTTEL	3004	3113	3213			3027	3114	3214		
660- PLOTTEL	3005	3017	3217			3028	3018	3218		
661- PLOTTEL	3006	3021	3221			3029	3022	3222		
662- PLOTTEL	3007	3209	3213			3030	3210	3214		
663- PLOTTEL	3008	3213	3217			3031	3214	3218		
664- PLOTTEL	3009	3217	3221			3032	3218	3222		
665- PLOTTEL	3010	3209	3305			3033	3210	3306		
666- PLOTTEL	3011	3305	3401			3034	3306	3402		
667- PLOTTEL	3012	3205	3405			3035	3306	3406		
668- PLOTTEL	3013	3209	3409			3036	3210	3410		
669- PLOTTEL	3014	3213	3413			3037	3214	3414		
670- PLOTTEL	3015	3217	3417			3038	3218	3418		
671- PLOTTEL	3016	3221	3421			3039	3222	3422		
672- PLOTTEL	3017	3401	3405			3040	3402	3406		
673- PLOTTEL	3018	3405	3409			3041	3406	3410		
674- PLOTTEL	3019	3409	3413			3042	3410	3414		
675- PLOTTEL	3020	3413	3417			3043	3414	3418		
676- PLOTTEL	3021	3417	3421			3044	3418	3422		
677- PLOTTEL	3022	3401	3601			3045	3402	3602		
678- PLOTTEL	3023	3405	3605			3046	3406	3606		
679- PLOTTEL	3056	3017	3018							
680- PLOTTEL	3057	3021	3022							
681- PLOTTEL	3058	3113	3114							
682- PLOTTEL	3059	3209	3210							
683- PLOTTEL	3060	3213	3214							
684- PLOTTEL	3061	3217	3218							
685- PLOTTEL	3062	3221	3222							
686- PLOTTEL	3063	3305	3306							
687- PLOTTEL	3064	3401	3402							
688- PLOTTEL	3065	3405	3406							
689- PLOTTEL	3066	3409	3410							
690- PLOTTEL	3067	3413	3414							
691- PLOTTEL	3068	3417	3418							
692- PLOTTEL	3069	3421	3422							
693- PLOTTEL	3070	3601	3602							
694- PLOTTEL	3071	3605	3606							
695- PLOTTEL	3072	3609	3610							
696- PLOTTEL	3073	3613	3614							
697- PLOTTEL	3074	3617	3618							
698- PLOTTEL	3075	3621	3622							
699- PLOTTEL	4401	4401	4405							
700- PLOTTEL	4402	4405	4409							



PHASE 2 SYMM CASE  
ORIGINAL ORBITER

SORTED BULK DATA ECHO

CARD	COUNT	1	2	3	4	5	6	7	8	9	10
701- PLOTTEL	4403	4431	4435								
702- PLOTTEL	4404	4435	4439								
703- PLOTTEL	4405	4401	4431								
704- PLOTTEL	4406	4405	4435								
705- PLOTTEL	4407	4409	4439								
706- PLOTTEL	4408	4435	2041								
707- PLOTTEL	4882	4882	4883								
708- PLOTTEL	4883	4883	4884								
709- PLOTTEL	4884	4884	4885								
710- PLOTTEL	4885	4885	4886								
711- PLOTTEL	4886	4886	4887								
712- PLOTTEL	4887	4887	4888								
713- PLOTTEL	4888	4888	4889								
714- PLOTTEL	4889	4889	4890								
715- PLOTTEL	4891	506	4882								
716- PLOTTEL	4892	4889	4892								
717- PLOTTEL	4893	4890	4892								
718- PLOTTEL	4894	4890	4891								
719- SPC	4401	4400	246								
720- SPC	4402	4400	135								
721- SPC	4881	4881	12		4892	2					
722- SPC	4882	4881	13		4892	13					
723- SPC1	1000	1	229	232	235	238	241				
724- SPC1	1000	1	1724	1823	1827	1831	1833	1835			
725- SPC1	1000	2	1157								
726- SPC1	1000	3	1515	1655							
727- SPC1	1000	3	1800								
728- SPC1	1000	12	918	919	1018	1019	1315	1316			
729- SPC1	1000	12	1413	1414							
730- SPC1	1000	12	1505	1506	1613	1614					
731- SPC1	1000	23	1926								
732- SPC1	1001	2	101	201	301	501	506	601			
733- SPC1	1001	2	241	911	1011	1111	1321	1406			
734- SPC1	1001	2	701	801	901	1101	1201	1401			
735- SPC1	1001	2	1516	1601	1606	1701	1800	1801			
736- SPC1	1001	2	1724	1833							
737- SPC1	1001	2	1802	1837	2001	2026	2040	2115			
738- SPC1	1002	1	1800								
739- SPC1	1002	3	241	1724	1833						
740- SPC1	1002	13	101	201	301	501	506	601			
741- SPC1	1002	13	701	801	901	1101	1201	1401			
742- SPC1	1002	13	911	1011	1111	1321	1406				
743- SPC1	1002	13	1516	1601	1606	1701	1801	1837			
744- SPC1	1002	13	2001	2026	2040	2115					
745- SPC1	4001	2	4002	4172							
746- SPC1	4002	3	4002	4172							
747- SPC1	4401	2	4462	4466	4470						
748- SPC1	4402	13	4462	4470							
749- SPC1	4881	246	4882	THRU	4890						
750- SPC1	4882	135	4882	THRU	4890						

PHASE 2 SYMM CASE  
ORIGINAL ORBITER

SORTED BULK DATA ECHO										
CARD	1	2	3	4	5	6	7	8	9	10
751- SPCADD	11	1000	1001	4001	4401	4881				
752- SPCADD	12	1000	1002	4002	4402	4882				
753- SUPORT	301	3	1800	1	3624	3				
ENDDATA										

ORIGINAL COLUMN PARTITION VECTORS FOR MERGING PHASE 1 MATRICES

INPUT BULK DATA DECK ECHO

```

. 1 .. 2 .. 3 .. 4 .. 5 .. 6 .. 7 .. 8 .. 9 .. 10 .
$ ORIGINAL COL. PARTITION VECTORS FOR MERGING PHASE 1 MATRICES
$ PARTITION VECTOR FOR SYMM FUSELAGE
DM1      CPFUSS      0      2      1      2      1290      1
DM1      CPFUSS      1      1      1.0      3      1.0      7      1.0  &FUSS1
&FUSS1   1.0      1.0      13      1.0      1.0      1.0      19      1.0  &FUSS2
&FUSS2   1.0      1.0      25      1.0      27      1.0      31      1.0  &FUSS3
&FUSS3   1.0      1.0      38      1.0      1.0      43      1.0      1.0  &FUSS4
&FUSS4   1.0      50      1.0      1.0      56      1.0      1.0      62  &FUSS5
&FUSS5   1.0      1.0      69      1.0      73      1.0      75      1.0  &FUSS6
&FUSS6   79      1.0      1.0      1.0      85      1.0      1.0      1.0  &FUSS7
&FUSS7   91      1.0      93      1.0      97      1.0      1.0      1.0  &FUSS8
&FUSS8  105      1.0     109      1.0      1.0      1.0     115      1.0  &FUSS9
&FUSS9  117      1.0     121      1.0      1.0      1.0     127      1.0  &FUSS10
&FUSS10  1.0      1.0     133      1.0     135      1.0     139      1.0  &FUSS11
&FUSS11  1.0      1.0     145      1.0      1.0      1.0     151      1.0  &FUSS12
&FUSS12  1.0      1.0     157      1.0     159      1.0     163      1.0  &FUSS13
&FUSS13  1.0      1.0     169      1.0      1.0      1.0     175      1.0  &FUSS14
&FUSS14  177      1.0     181      1.0      1.0      1.0     187      1.0  &FUSS15
&FUSS15  189      1.0     195      1.0     201      1.0     205      1.0  &FUSS16
&FUSS16  1.0      1.0     211      1.0     213      1.0     219      1.0  &FUSS17
&FUSS17  225      1.0     229      1.0     231      1.0     235      1.0  &FUSS18
&FUSS18  1.0      1.0     241      1.0     243      1.0     247      1.0  &FUSS19
&FUSS19  1.0      1.0     253      1.0      1.0      1.0     259      1.0  &FUSS20
&FUSS20  1.0      1.0     265      1.0      0.0      1.0     271      1.0  &FUSS21
&FUSS21  1.0      1.0     277      1.0     279      1.0     283      1.0  &FUSS22
&FUSS22  1.0      1.0     289      1.0      1.0      1.0     295      1.0  &FUSS23
&FUSS23  1.0      1.0     301      1.0      1.0      1.0     307      1.0  &FUSS24
&FUSS24  1.0      1.0     315      1.0     321      1.0     325      1.0  &FUSS25
&FUSS25  327      1.0     331      1.0     333      1.0     337      1.0  &FUSS26
&FUSS26  1.0      1.0     343      1.0     345      1.0     349      1.0  &FUSS27
&FUSS27  1.0      1.0     357      1.0     363      1.0     367      1.0  &FUSS28
&FUSS28  1.0      1.0     373      1.0      1.0      1.0     381      1.0  &FUSS29
&FUSS29  387      1.0     391      1.0      1.0     397      1.0     399  &FUSS30
&FUSS30  1.0     403      1.0     405      1.0     409      1.0      1.0  &FUSS31
&FUSS31  1.0     415      1.0     417      1.0     421      1.0      1.0  &FUSS32
&FUSS32  1.0     429      1.0     435      1.0     439      1.0      1.0  &FUSS33
&FUSS33  1.0     445      1.0      1.0     451      1.0      1.0  &FUSS34
&FUSS34  459      1.0     463      1.0      1.0      1.0     469      1.0  &FUSS35
&FUSS35  1.0      1.0     475      1.0      1.0      1.0     483      1.0  &FUSS36
&FUSS36  487      1.0     495      1.0     505      1.0      1.0  &FUSS37
&FUSS37  511      1.0      1.0      1.0     518      1.0      1.0  &FUSS38
&FUSS38  1.0      1.0      1.0     530      1.0      1.0     542      1.0  &FUSS39
&FUSS39  1.0     555      1.0     560      1.0      1.0     565      1.0  &FUSS40
&FUSS40  567      1.0     571      1.0      1.0      1.0     577      1.0  &FUSS41
&FUSS41  1.0      1.0     583      1.0      1.0      1.0     589      1.0  &FUSS42
&FUSS42  595      1.0     597      1.0     601      1.0      1.0  &FUSS43
&FUSS43  607      1.0      1.0      1.0     613      1.0     615      1.0  &FUSS44
&FUSS44  619      1.0      1.0      1.0     637      1.0     639      1.0  &FUSS45
&FUSS45  643      1.0      1.0      1.0     649      1.0      1.0  &FUSS46
&FUSS46  655      1.0     657      1.0     661      1.0      1.0  &FUSS47

```

ORIGINAL COLUMN PARTITION VECTORS FOR MERGING PHASE 1 MATRICES

```

INPUT BULK DATA DECK ECHO

. 1 .. 2 .. 3 .. 4 .. 5 .. 6 .. 7 .. 8 .. 9 .. 10 .
EFUSS47 1.0 1.0 1.0
$ PARTITION VECTOR FOR SYMM DOORS
DMI CPDOORS 0 2 1 2 1290 1
DMI CPDOORS 1 1047 1.0 1052 1.0 1058 EDORS1
EDORS1 1.0 1.0 1064 1.0 1.0 1070 1.0 EDORS2
EDORS2 1075 1.0 1077 1.0 1081 1.0 1083 1.0 EDORS3
EDORS3 1087 1.0 1089 1.0 1093 1.0 1095 1.0 EDORS4
EDORS4 1101 1.0 1106 1.0 1.0 1112 1.0 1.0 EDORS5
EDORS5 1118 1.0 1.0 1124 1.0 1.0
$ PARTITION VECTOR FOR SYMM FIN
DMI CPFINS 0 2 1 2 1290 1
DMI CPFINS 1 1129 1.0 1131 1.0 1133 1.0 EFINS1
EFINS1 1153 1.0 1.0 1.0 1159 1.0 1.0 EFINS2
EFINS2 1165 1.0 1.0 1.0 1171 1.0 1.0 1177 EFINS3
EFINS3 1.0 1179 1.0 1183 1.0 1189 1.0 EFINS4
EFINS4 1.0 1201 1.0 1207 1.0 1.0 1213 1.0 EFINS5
EFINS5 1215 1.0
$ PARTITION VECTOR FOR SYMM PAYLOAD
DMI CPPAYS 0 2 1 2 1290 1
DMI CPPAYS 1 1221 1.0 1225 1.0 1229 1.0 EPAYS1
EPAYS1 1231 1.0 1233 1.0 1235 1.0 1237 1.0 EPAYS2
EPAYS2 1239 1.0 1241 1.0 1243 1.0 1245 1.0 EPAYS3
EPAYS3 1247 1.0 1249 1.0 1251 1.0 1253 1.0 EPAYS4
EPAYS4 1255 1.0 1257 1.0 1259 1.0 1261 1.0 EPAYS5
EPAYS5 1263 1.0 1265 1.0 1273 1.0 1281 1.0 EPAYS6
EPAYS6 1285 1.0
$ PARTITION VECTOR FOR WING
DMI CPWING 0 2 1 2 1290 1
DMI CPWING 1 667 1.0 1.0 1.0 673 1.0 EWING1
EWING1 1.0 1.0 679 1.0 1.0 1.0 685 1.0 EWING2
EWING2 1.0 1.0 691 1.0 1.0 1.0 697 1.0 EWING3
EWING3 1.0 1.0 703 1.0 1.0 1.0 709 1.0 EWING4
EWING4 1.0 1.0 715 1.0 1.0 1.0 721 1.0 EWING5
EWING5 1.0 1.0 727 1.0 1.0 1.0 733 1.0 EWING6
EWING6 1.0 1.0 739 1.0 1.0 1.0 745 1.0 EWING7
EWING7 1.0 1.0 751 1.0 1.0 1.0 757 1.0 EWING8
EWING8 1.0 1.0 763 1.0 1.0 1.0 769 1.0 EWING9
EWING9 1.0 1.0 775 1.0 1.0 1.0 781 1.0 EWING10
EWING10 1.0 1.0 787 1.0 1.0 1.0 793 1.0 EWING11
EWING11 1.0 1.0 799 1.0 1.0 1.0 805 1.0 EWING12
EWING12 1.0 1.0 811 1.0 1.0 1.0 817 1.0 EWING13
EWING13 1.0 1.0 823 1.0 1.0 1.0 829 1.0 EWING14
EWING14 1.0 1.0 835 1.0 1.0 1.0 841 1.0 EWING15
EWING15 1.0 1.0 847 1.0 1.0 1.0 853 1.0 EWING16
EWING16 1.0 1.0 859 1.0 1.0 1.0 865 1.0 EWING17
EWING17 1.0 1.0 871 1.0 1.0 1.0 877 1.0 EWING18
EWING18 1.0 1.0 883 1.0 1.0 1.0 889 1.0 EWING19
EWING19 1.0 1.0 895 1.0 1.0 1.0 901 1.0 EWING20
EWING20 1.0 1.0 909 1.0 913 1.0 915 1.0 EWING21
EWING21 919 1.0 1.0 1.0 925 1.0 927 1.0 EWING22

```

ORIGINAL COLUMN PARTITION VECTORS FOR MERGING PHASE 1 MATRICES

INPUT BULK DATA DECK ECHO																				
.	1	..	2	..	3	..	4	..	5	..	6	..	7	..	8	..	9	..	10	.
EWING22	931		1.0		1.0		1.0		937		1.0		939		1.0		EWING23			
EWING23	943		1.0		1.0		1.0		949		1.0		951		1.0		EWING24			
EWING24	955		1.0		1.0		1.0		961		1.0		1.0		1.0		EWING25			
EWING25	967		1.0		1.0		1.0		973		1.0		1.0		1.0		EWING26			
EWING26	979		1.0		1.0		1.0		985		1.0		1.0		1.0		EWING27			
EWING27	991		1.0		1.0		1.0		997		1.0		1.0		1.0		EWING28			
EWING28	1003		1.0		1.0		1.0		1009		1.0		1.0		1.0		EWING29			
EWING29	1015		1.0		1.0		1.0		1021		1.0		1.0		1.0		EWING30			
EWING30	1027		1.0		1.0		1.0		1033		1.0		1.0		1.0		EWING31			
EWING31	1039		1.0		1.0		1.0													
\$ PARTITION VECTOR FOR ANTI FUSELAGE																				
DM1	CPFUSA		0		2		1		2				1290		1					
DM1	CPFUSA		1		2		1.0		7		1.0		1.0		1.0		EFUSA1			
EFUSA1	13		1.0		1.0		1.0		19		1.0		1.0		1.0		EFUSA2			
EFUSA2	26		1.0		31		1.0		1.0		1.0		38		1.0		EFUSA3			
EFUSA3	1.0		43		1.0		1.0		1.0		50		1.0		1.0		EFUSA4			
EFUSA4	56		1.0		1.0		62		1.0		1.0		68		1.0		EFUSA5			
EFUSA5	74		1.0		79		1.0		1.0		1.0		85		1.0		EFUSA6			
EFUSA6	1.0		1.0		92		1.0		97		1.0		1.0		1.0		EFUSA7			
EFUSA7	104		1.0		109		1.0		1.0		1.0		116		1.0		EFUSA8			
EFUSA8	121		1.0		1.0		1.0		127		1.0		1.0		1.0		EFUSA9			
EFUSA9	134		1.0		139		1.0		1.0		1.0		145		1.0		EFUSA10			
EFUSA10	1.0		1.0		151		1.0		1.0		1.0		158		1.0		EFUSA11			
EFUSA11	163		1.0		1.0		1.0		169		1.0		1.0		1.0		EFUSA12			
EFUSA12	176		1.0		181		1.0		1.0		1.0		188		1.0		EFUSA13			
EFUSA13	195		1.0		201		1.0		205		1.0		1.0		1.0		EFUSA14			
EFUSA14	212		1.0		219		1.0		225		1.0		230		1.0		EFUSA15			
EFUSA15	235		1.0		1.0		1.0		242		1.0		247		1.0		EFUSA16			
EFUSA16	1.0		1.0		253		1.0		1.0		1.0		259		1.0		EFUSA17			
EFUSA17	1.0		1.0		265		1.0		0.0		1.0		271		1.0		EFUSA18			
EFUSA18	1.0		1.0		278		1.0		283		1.0		1.0		1.0		EFUSA19			
EFUSA19	289		1.0		1.0		1.0		295		1.0		1.0		1.0		EFUSA20			
EFUSA20	301		1.0		1.0		1.0		307		1.0		1.0		1.0		EFUSA21			
EFUSA21	315		1.0		321		1.0		326		1.0		332		1.0		EFUSA22			
EFUSA22	337		1.0		1.0		1.0		344		1.0		349		1.0		EFUSA23			
EFUSA23	1.0		1.0		357		1.0		363		1.0		367		1.0		EFUSA24			
EFUSA24	1.0		1.0		373		1.0		1.0		1.0		381		1.0		EFUSA25			
EFUSA25	387		1.0		391		1.0		1.0		398		1.0		404		EFUSA26			
EFUSA26	1.0		409		1.0		1.0		1.0		416		1.0		421		EFUSA27			
EFUSA27	1.0		1.0		1.0		429		1.0		435		1.0		439		EFUSA28			
EFUSA28	1.0		1.0		1.0		445		1.0		1.0		451		1.0		EFUSA29			
EFUSA29	1.0		1.0		458		1.0		463		1.0		1.0		1.0		EFUSA30			
EFUSA30	469		1.0		1.0		1.0		475		1.0		1.0		1.0		EFUSA31			
EFUSA31	482		1.0		488		1.0		501		1.0		505		1.0		EFUSA32			
EFUSA32	1.0		1.0		511		1.0		1.0		1.0		518		1.0		EFUSA33			
EFUSA33	1.0		523		1.0		1.0		1.0		530		1.0		1.0		EFUSA34			
EFUSA34	542		1.0		1.0		554		1.0		560		1.0		1.0		EFUSA35			
EFUSA35	566		1.0		571		1.0		1.0		1.0		0.0		577		EFUSA36			
EFUSA36	1.0		1.0		1.0		583		1.0		1.0		1.0		589		EFUSA37			
EFUSA37	1.0		596		1.0		601		1.0		1.0		1.0		607		EFUSA38			

ORIGINAL COLUMN PARTITION VECTORS FOR MERGING PHASE 1 MATRICES

INPUT BULK DATA DECK ECHO										
	1	2	3	4	5	6	7	8	9	10
EFUSA38	1.0	1.0	1.0	614	1.0	619	1.0	1.0	1.0	EFUSA39
EFUSA39	1.0	638	1.0	643	1.0	1.0	1.0	649	1.0	EFUSA40
EFUSA40	1.0	1.0	1.0	656	1.0	661	1.0	1.0	1.0	EFUSA41
EFUSA41	1.0	1.0	1.0	1.0						
\$ PARTITION VECTOR FOR ANTI DOORS										
DMI	CPDORA	0	2	1	2			1290	1	
DMI	CPDORA	1	1046	1.0	1052	1.0	1.0	1058	1.0	EDORA1
EDORA1	1.0	1.0	1064	1.0	1.0	1070	1.0	1.0	1.0	EDORA2
EDORA2	1075	1.0	1077	1.0	1081	1.0	1083	1.0	1.0	EDORA3
EDORA3	1087	1.0	1089	1.0	1093	1.0	1095	1.0	1.0	EDORA4
EDORA4	1100	1.0	1106	1.0	1.0	1112	1.0	1.0	1.0	EDORA5
EDORA5	1118	1.0	1.0	1124	1.0	1.0				
\$ PARTITION VECTOR FOR ANTI FIN										
DMI	CPFINA	0	2	1	2			1290	1	
DMI	CPFINA	1	1130	1.0	1132	1.0	1134	1.0	1.0	EFINA1
EFINA1	1153	1.0	1.0	1.0	1159	1.0	1.0	1.0	1.0	EFINA2
EFINA2	1165	1.0	1.0	1.0	1171	1.0	1.0	1178	1.0	EFINA3
EFINA3	1.0	1183	1.0	1189	1.0	1.0	1.0	1196	1.0	EFINA4
EFINA4	1.0	1201	1.0	1207	1.0	1.0	1214	1.0	1.0	
\$ PARTITION VECTOR FOR ANTI PAYLOAD										
DMI	CPPAYA	0	2	1	2			1290	1	
DMI	CPPAYA	1	1220	1.0	1226	1.0	1230	1.0	1.0	EPAYA1
EPAYA1	1232	1.0	1234	1.0	1236	1.0	1238	1.0	1.0	EPAYA2
EPAYA2	1240	1.0	1242	1.0	1244	1.0	1246	1.0	1.0	EPAYA3
EPAYA3	1248	1.0	1250	1.0	1252	1.0	1254	1.0	1.0	EPAYA4
EPAYA4	1256	1.0	1258	1.0	1260	1.0	1262	1.0	1.0	EPAYA5
EPAYA5	1264	1.0	1266	1.0	1268	1.0	1272	1.0	1.0	EPAYA6
EPAYA6	1278	1.0	1281	1.0	1286	1.0				
ENDDATA										

TOTAL COUNT# 179

\*\*\* USER INFORMATION MESSAGE 207. BULK DATA NOT SORTED. XSORT WILL RE-ORDER DECK.

PHASE 2 ANTI CASE  
ORIGINAL ORBITER

CARD COUNT	CASE CONTROL DECK ECHO
1	TITLE = PHASE 2 ANTI CASE
2	SUBTITLE = ORIGINAL ORBITER
3	ECHO = 90TH
4	SPC = 12
5	MPC = 22
6	METHOD = 1
7	BEGIN BULK

PHASE 2 ANTI CASE  
ORIGINAL ORBITER

MAY 18, 1974 NASTRAN 2/ 1/74

INPUT BULK DATA DECK ECHO

```

. 1 .. 2 .. 3 .. 4 .. 5 .. 6 .. 7 .. 8 .. 9 .. 10 .
$ CONVERT ORIGINAL SYM PHASE 2 TO ORIGINAL ANTI PHASE 2
/      1      3
/      5
/      7      10
/     25      26
/     41      45
/     592     593
/     753
ASET1      2      1516      1606      1800
ASET1      6      4890
ASET1      2      506      1701
ASET1      3      1802
ASET1      2      101      201      301      501      601      701      801
ASET1      2      901      1101      1201      1401      1601      1837      2001
ASET1     25      4882
ASET1     26      4889
ASET1    245      4400
ASET1    246      4883      THRU      4888
ASET1      2      2026      2040      2115
DMI      EQR      0      2      1      2      3      3
DMI      EQR      1      1      1.0      -48.432 68.25
DMI      EQR      2      1      1.0      -45.5 165.25
DMI      EQR      3      1      .190895 -22.157732.36945
EIGR      1      INV      0.0      200.      14      14      1.-3 6EIG1
PARAM      TPNAME9 ORCOUPA
PARAM      TPNAME ORBTAP2
SUPOFT     301      2      1800      2      3624      3
ENDDATA

```

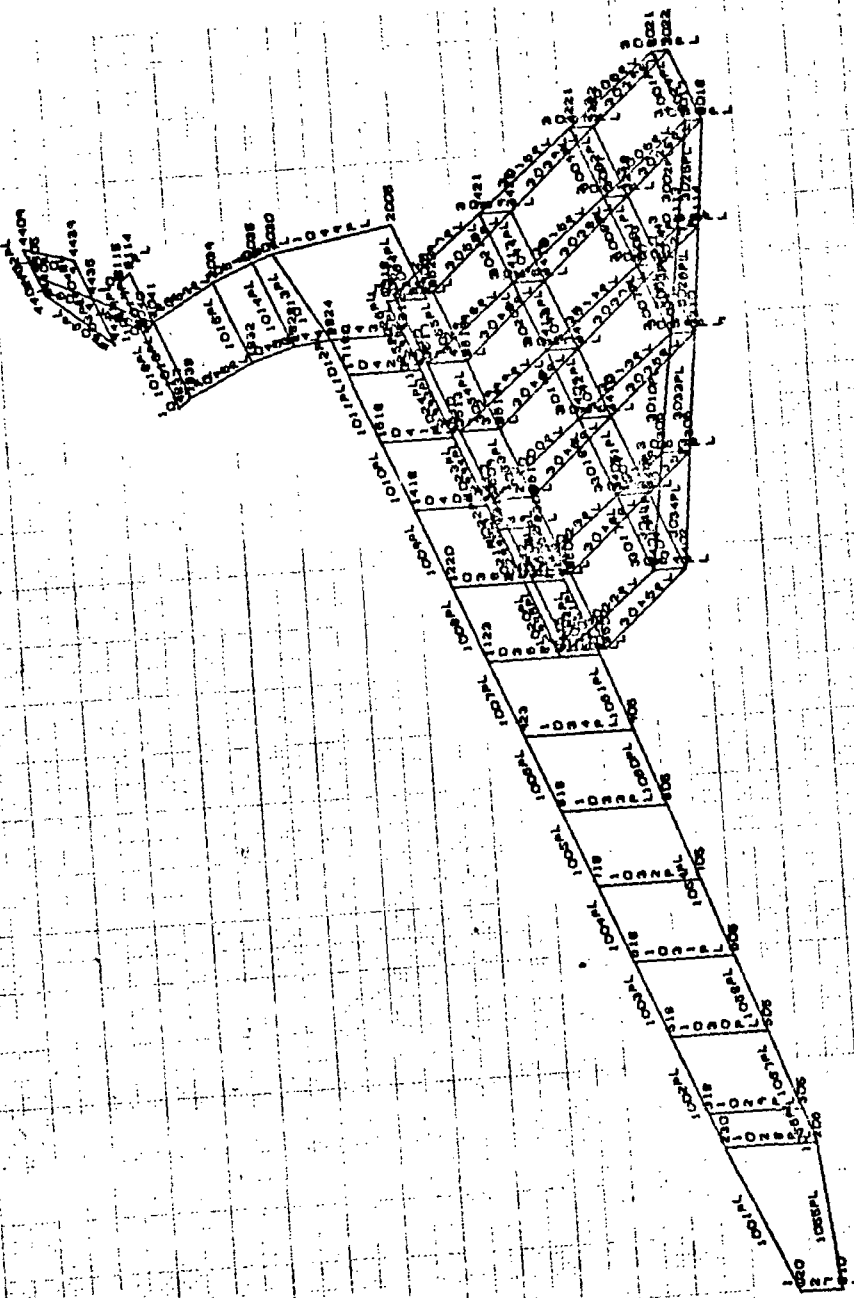
TOTAL COUNT= 28

\*\*\* USER INFORMATION MESSAGE 207. BULK DATA NOT SORTED. XSORT WILL RE-ORDER DECK.



**Appendix B19**  
**PLOTS OF SYMMETRIC FREE-FREE MODES**  
**PHASE 2 ANALYSIS – MODEL 1 ORBITER**

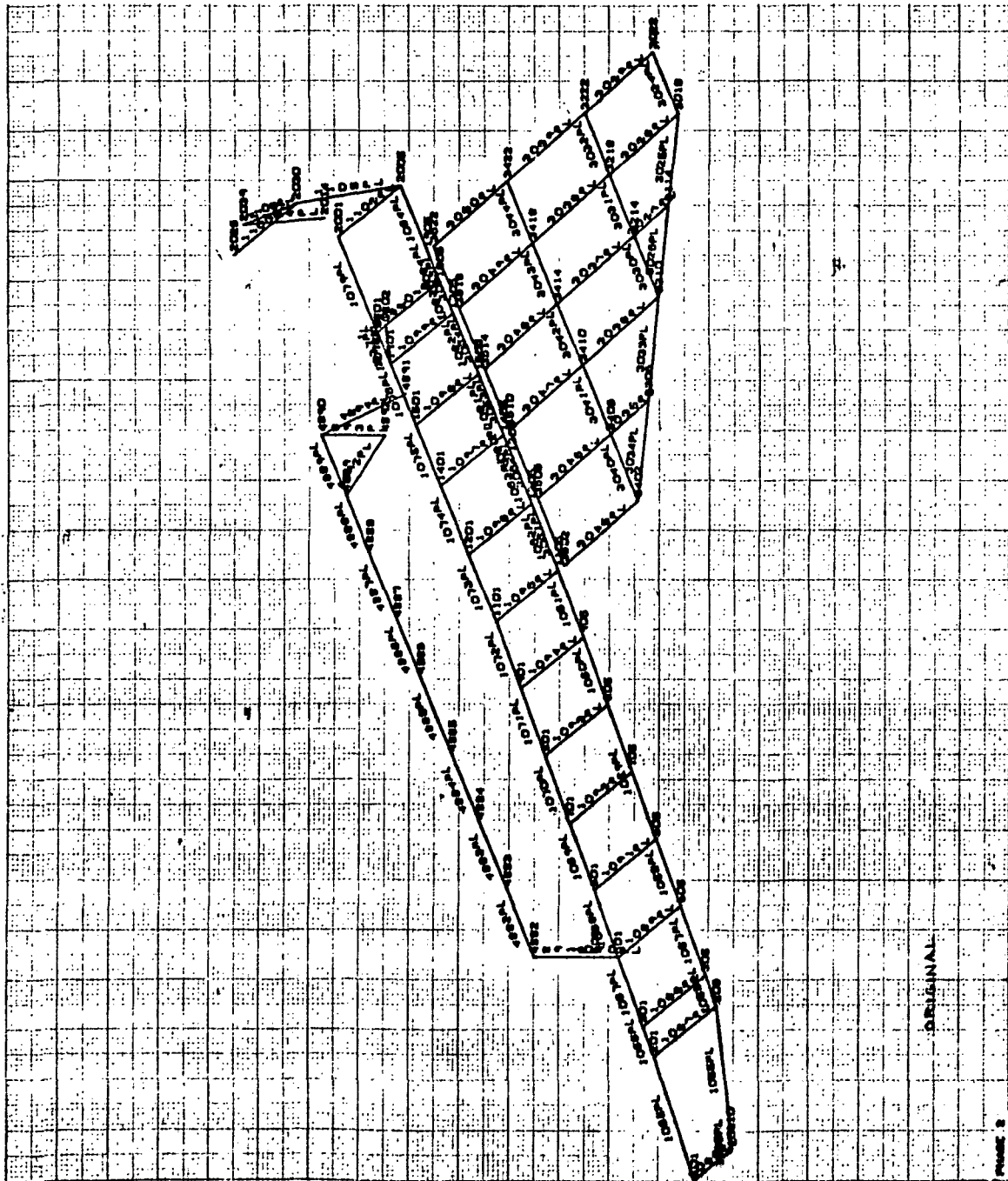
8/17/73



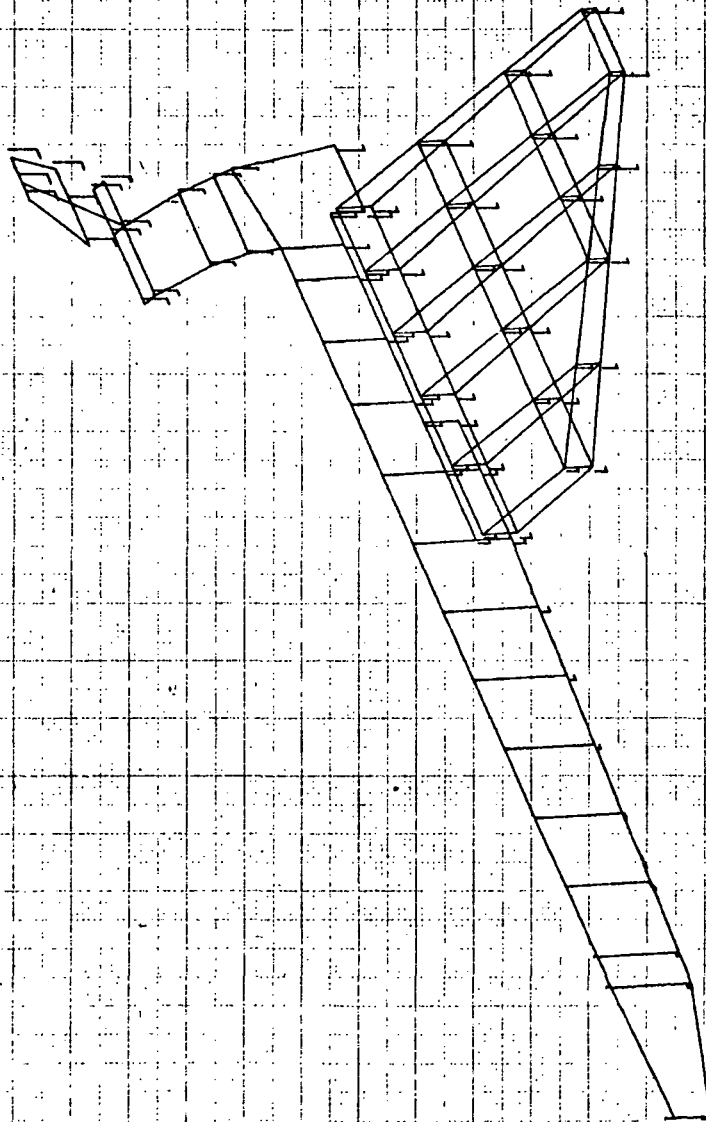
ORIGINAL

PHASE 2  
CHARTER  
UNDEFORMED SHAPE

2 8/17/78

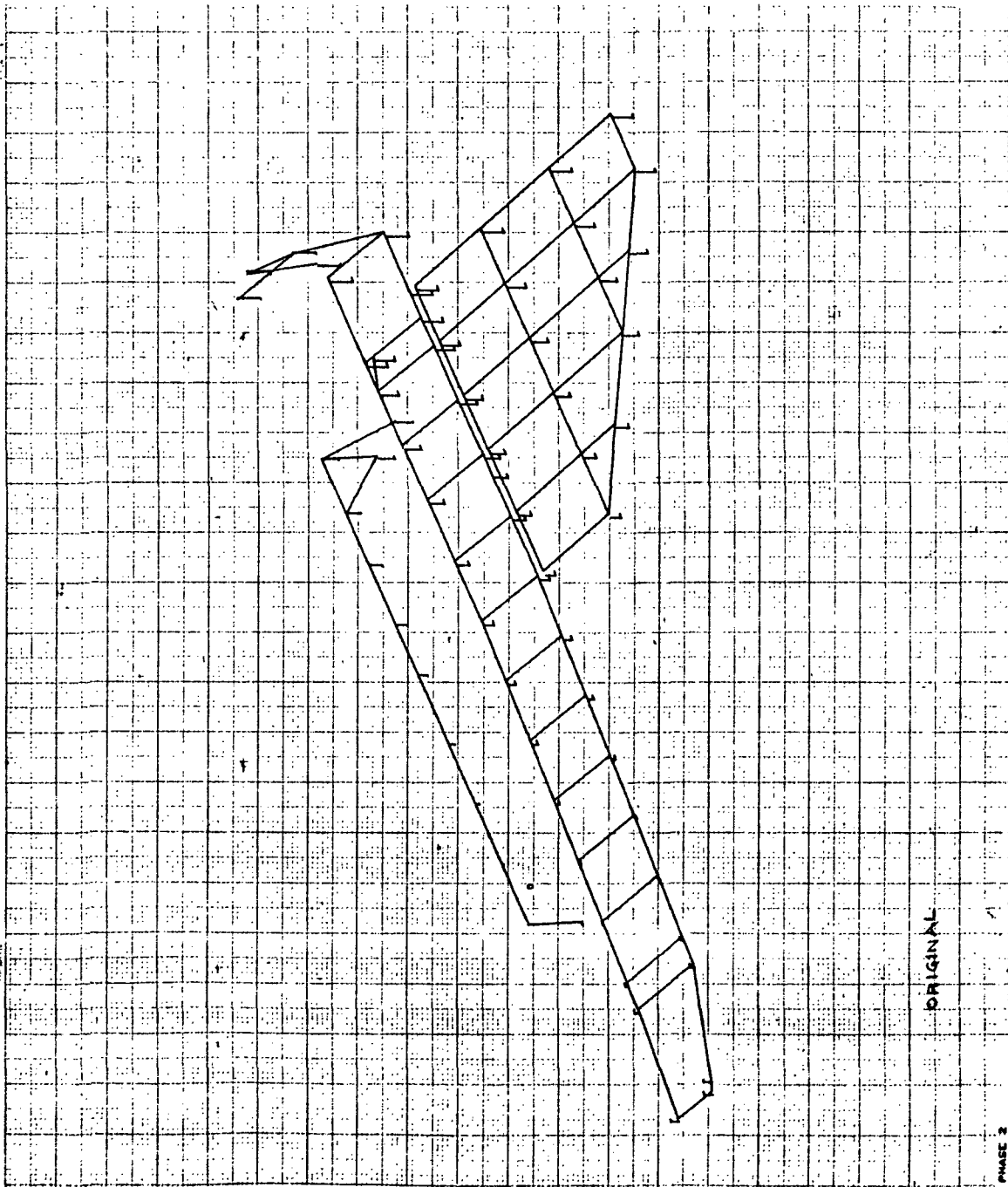


7/3/73 MAX-DEF. = 1.02042190



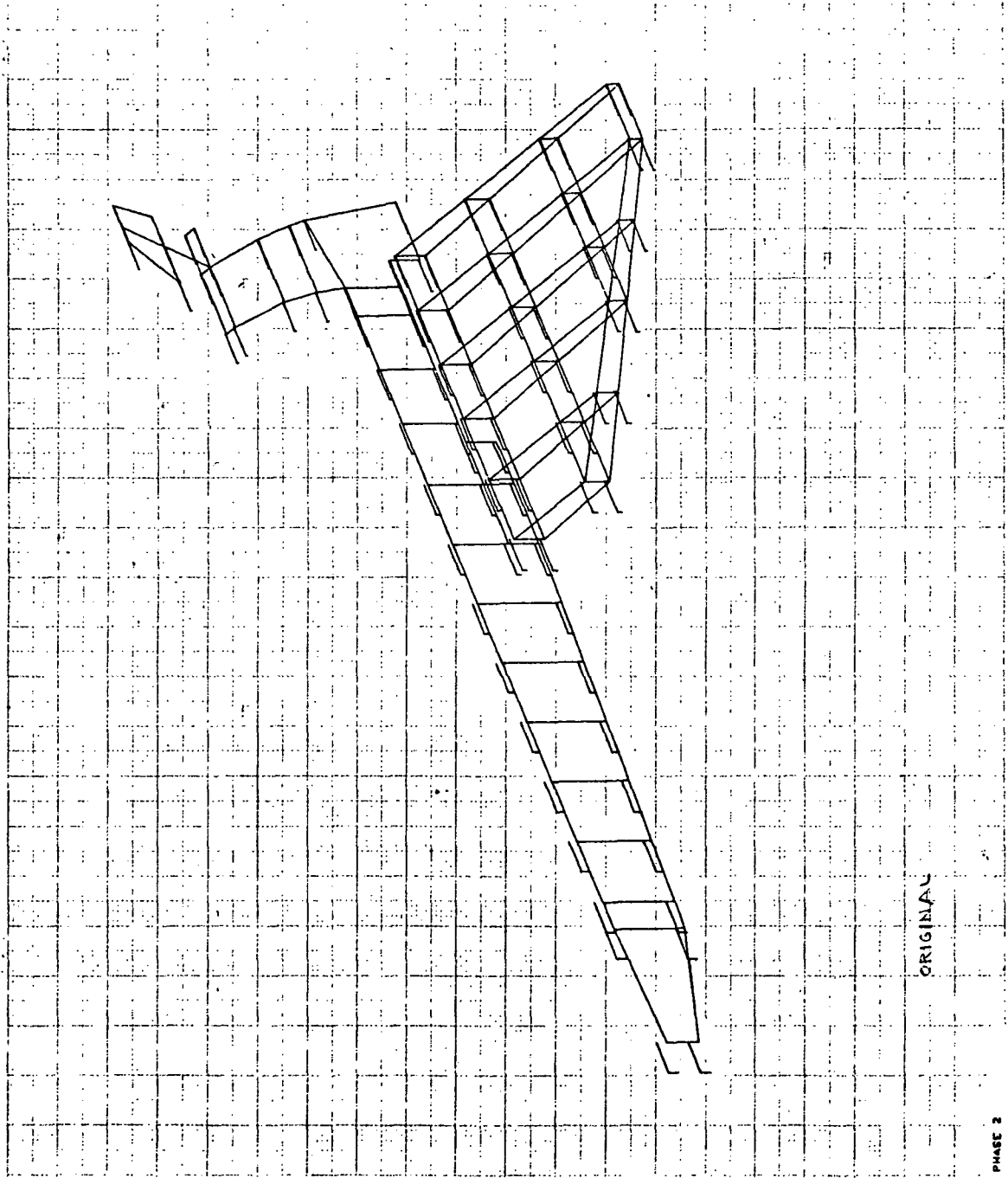
ORIGINAL

PHASE 2  
ORBITER SYMM CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 1 MODE 1 FREQ. 0.



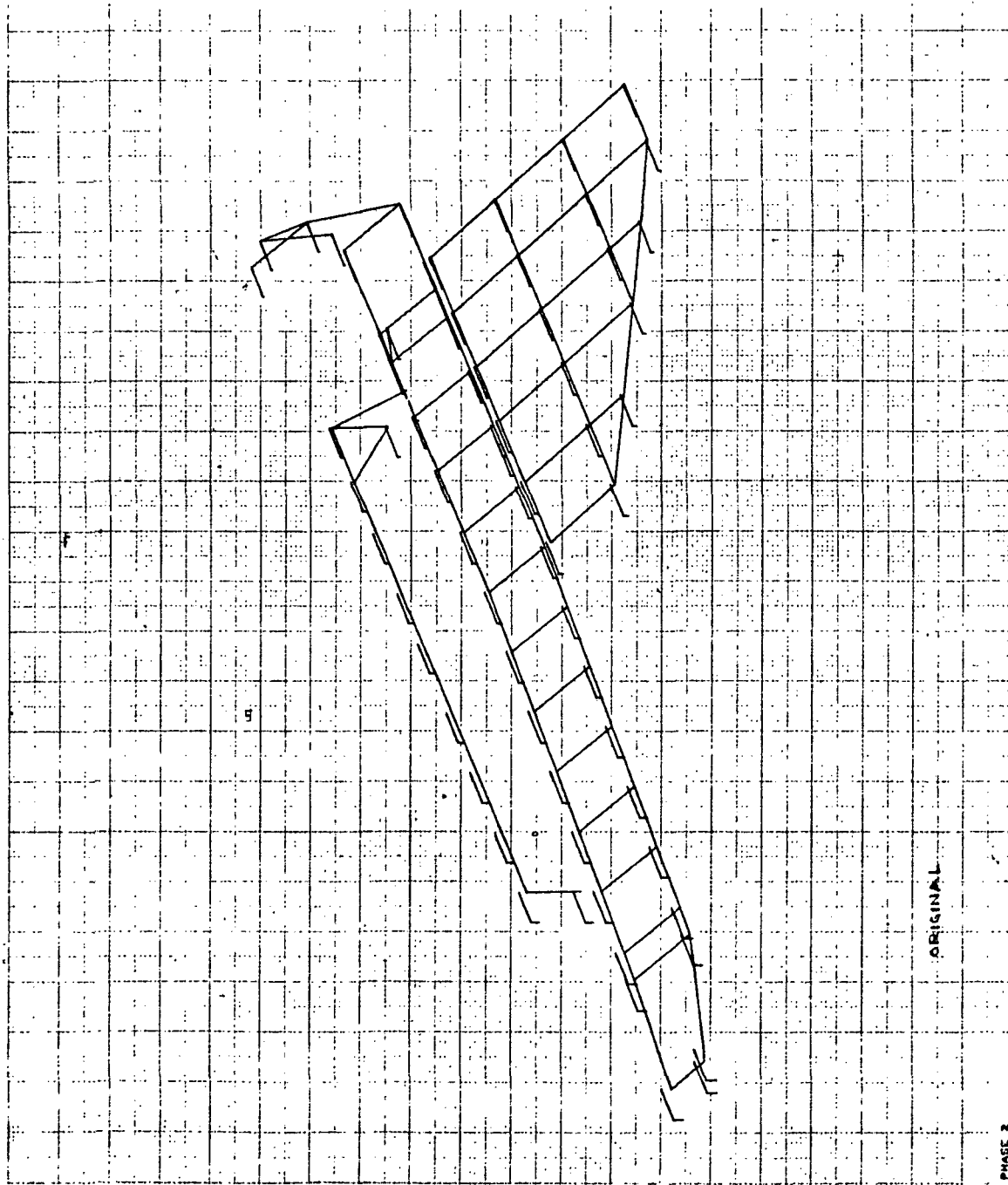
PHASE 2  
 ORBITER SYMM CASE  
 FREE FREE MODES  
 MODAL DEFOR. SUBCASE 1 MODE 1 FREQ. 0.

2 7/ 3/73 MAX-DEF. = 0.48970876



ORIGINAL

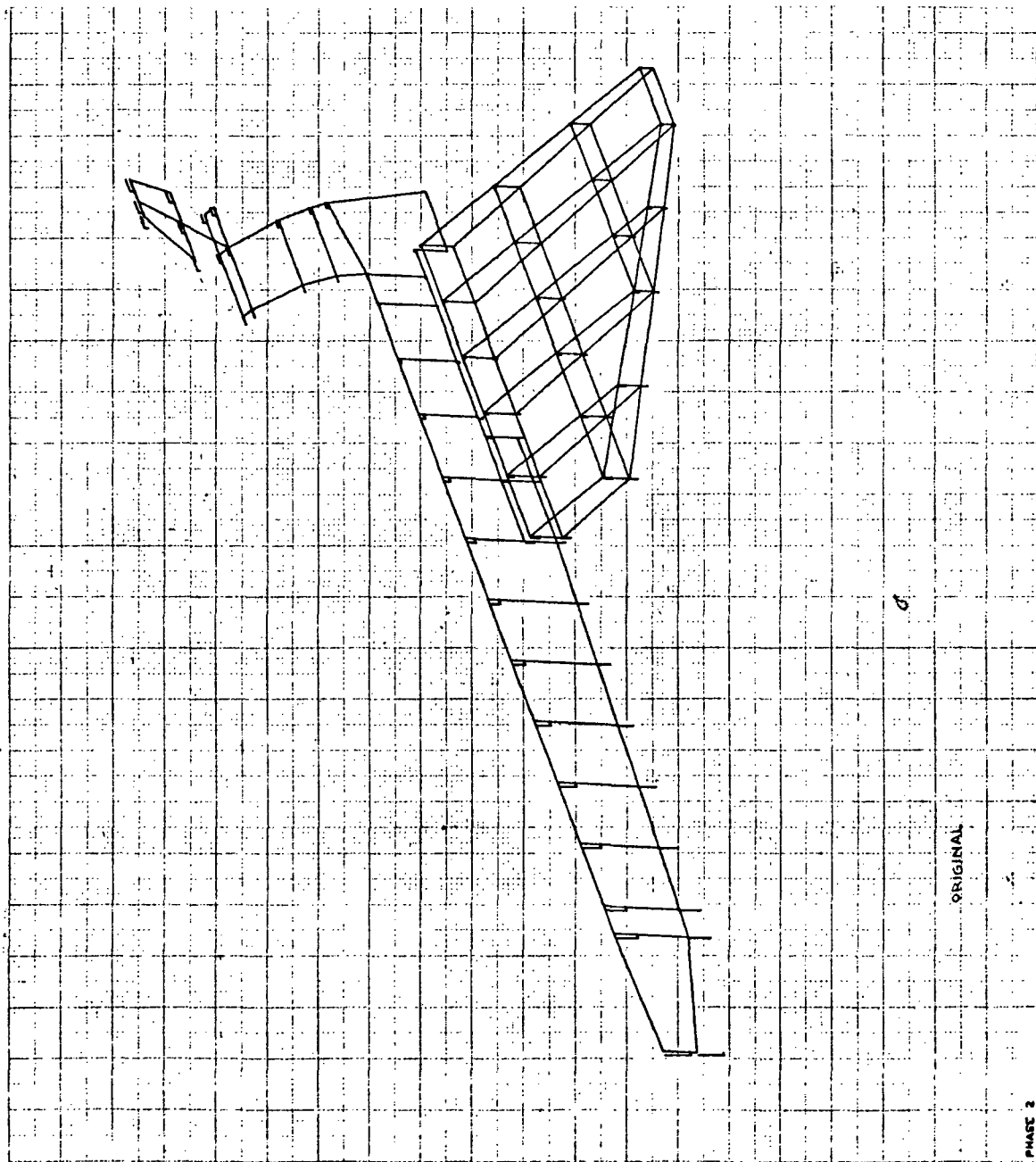
PHASE 2  
ORBITER SYMM CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 1 MOD 2 FREQ. 0.



ORIGINAL

PHASE 2  
ONBITER SYMM CAST  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 1 MODE 2 FREQ. 0.

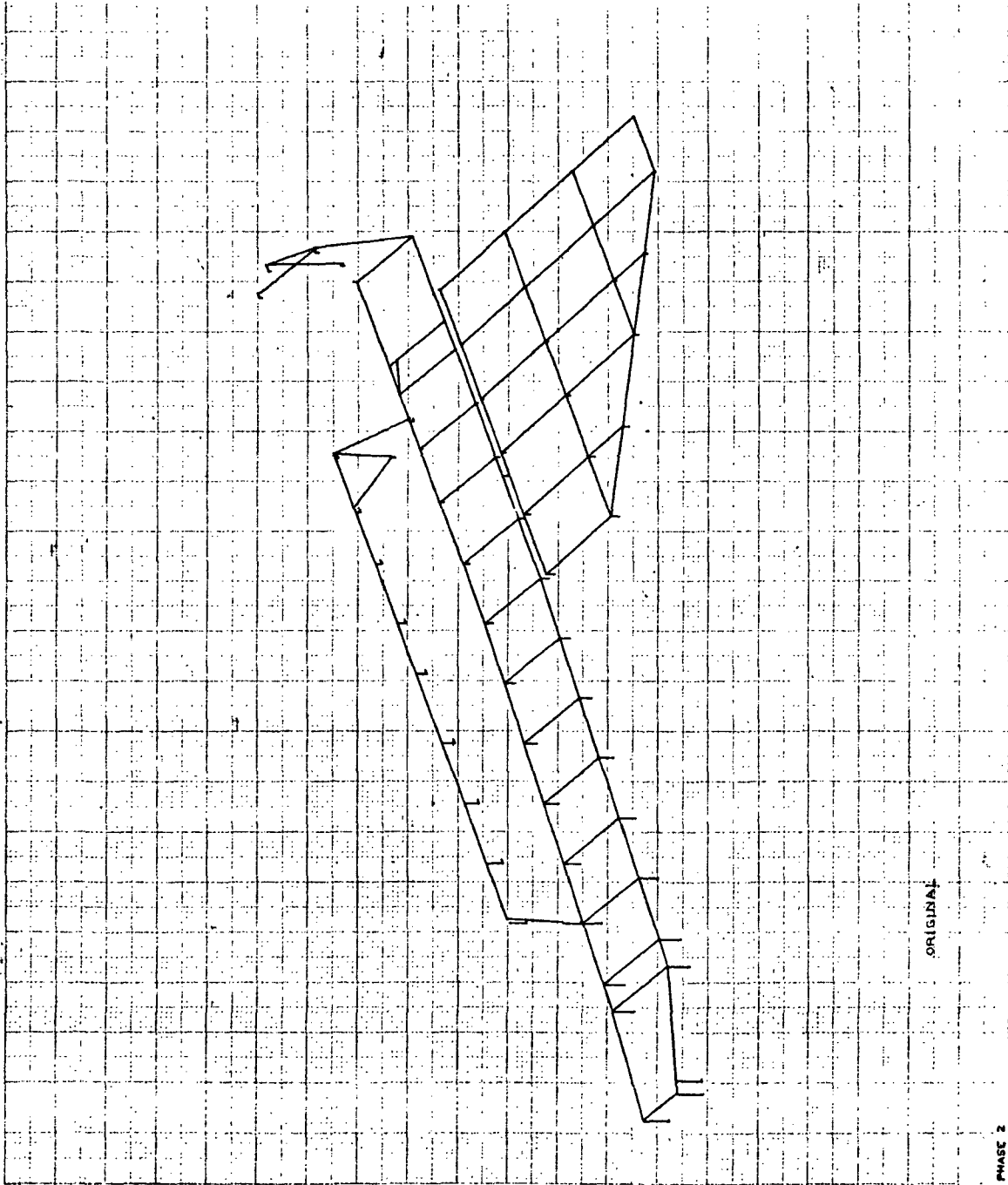
3 1/ 3/13 MAX-DEF. = 1.00000000



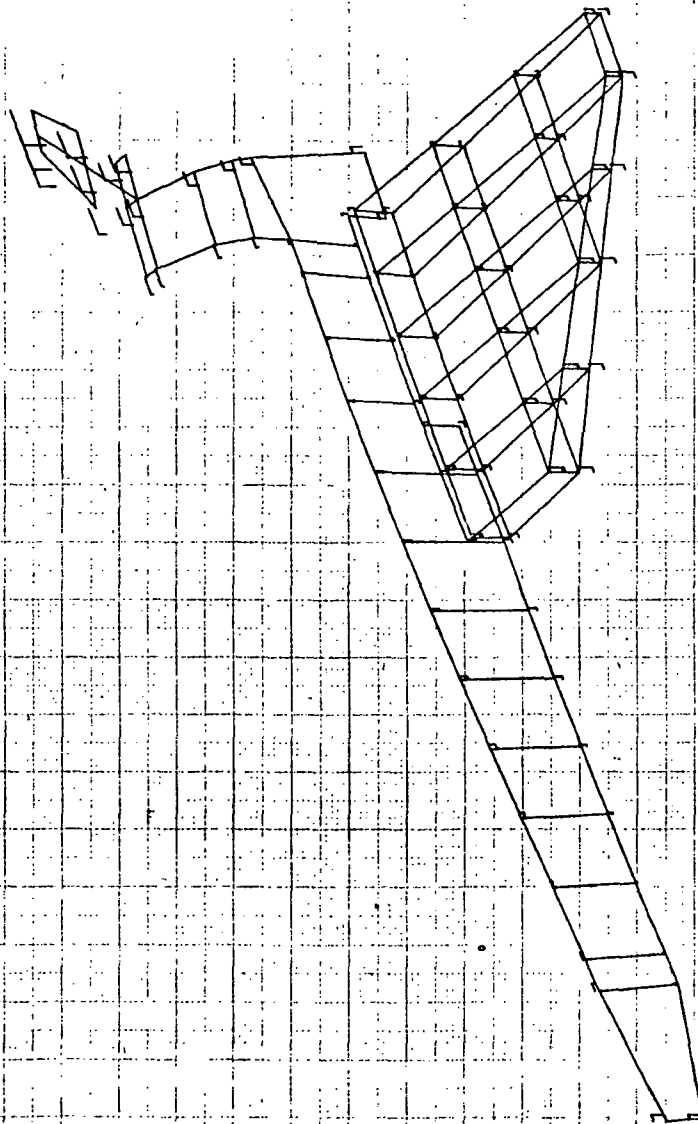
ORIGINAL

PHASE 2  
ORBITER EVAP CASE  
FREE FREE MODES  
MODAL DEFOR. SURFACE 1 MODE 3 FREE. 0.



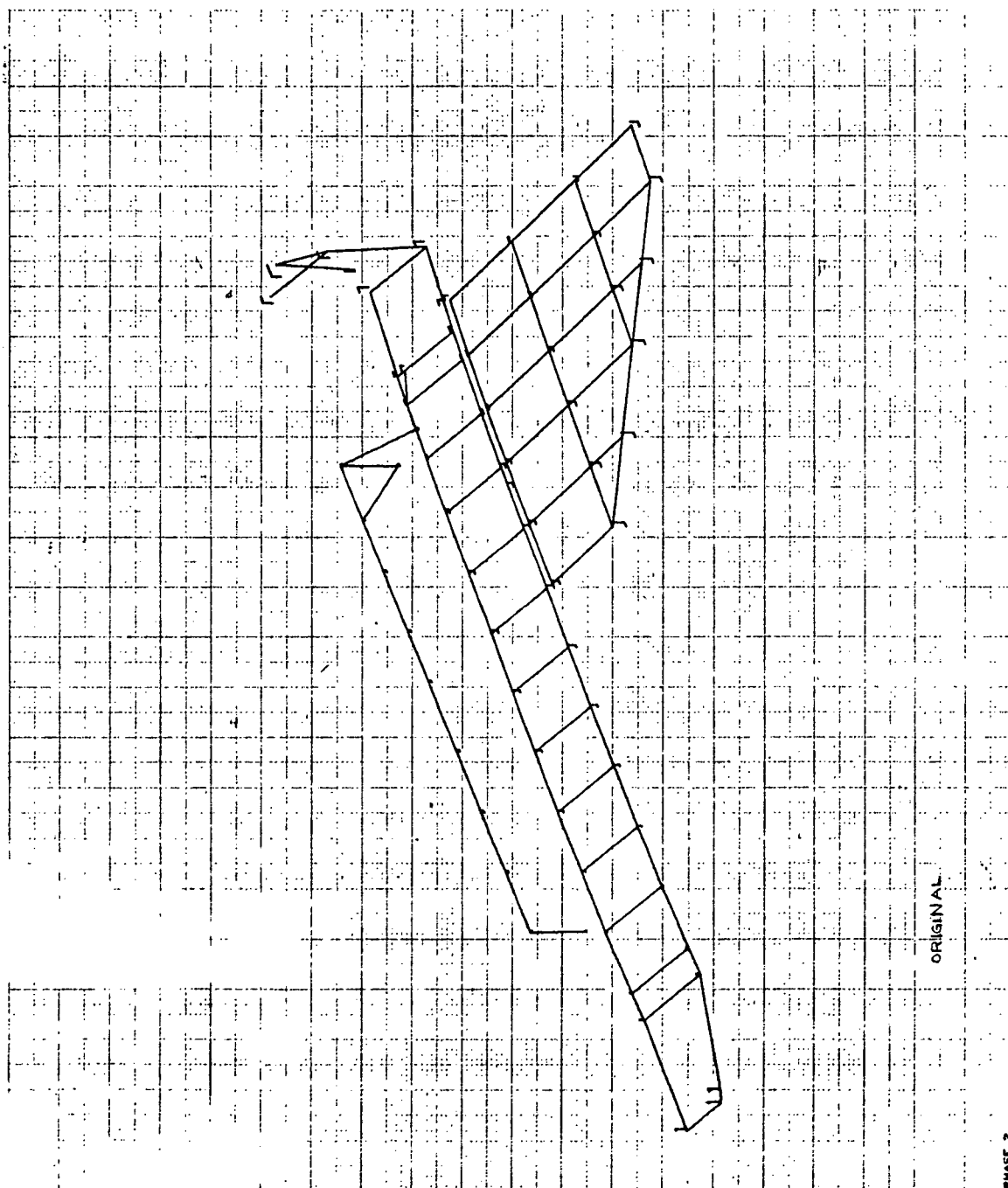


4 7/ 3/73 MAX-DEF. = 1.00000000



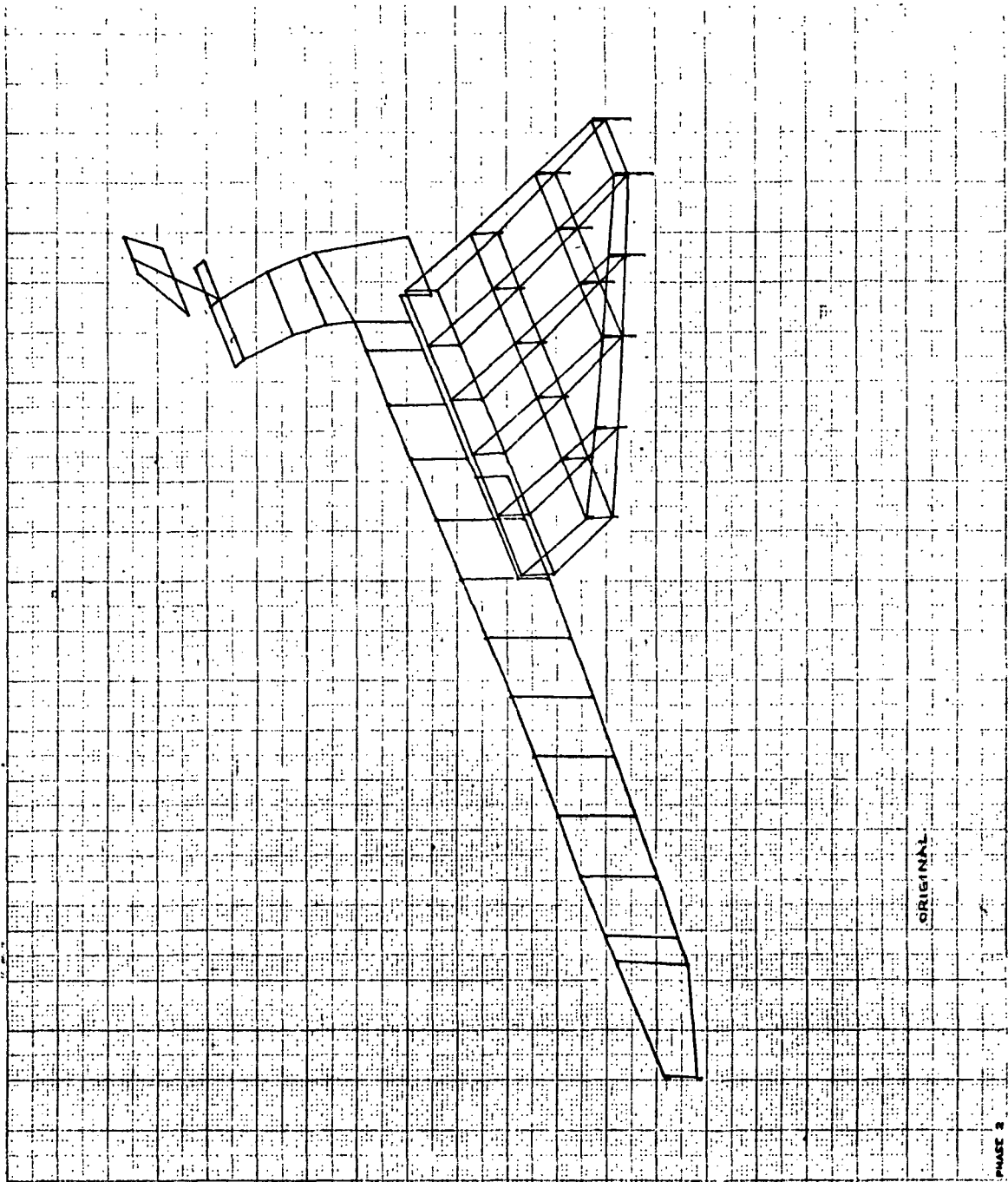
ORIGINAL

PHASE 2  
ORBITER SYMM CASE  
FREE FREE MODES  
MODAL DEFON. SUBCASE 1 MODE 3 FREQ. 93.24297



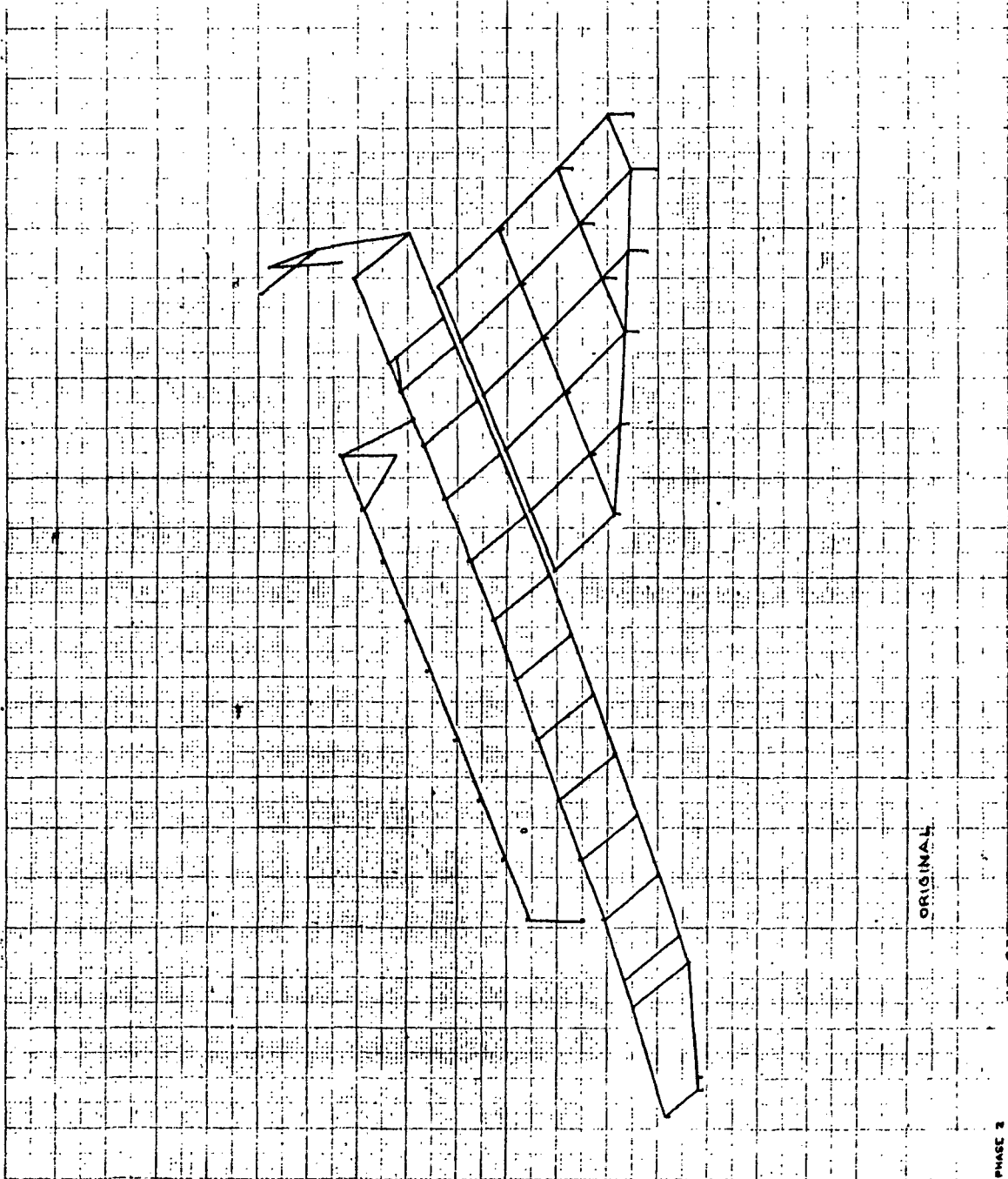
PHASE 2  
ORBITER SYMM CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 1 MODE 4 FREQ. 53.24247

6 7/3/73 MAX-DEF. = 1.00000000



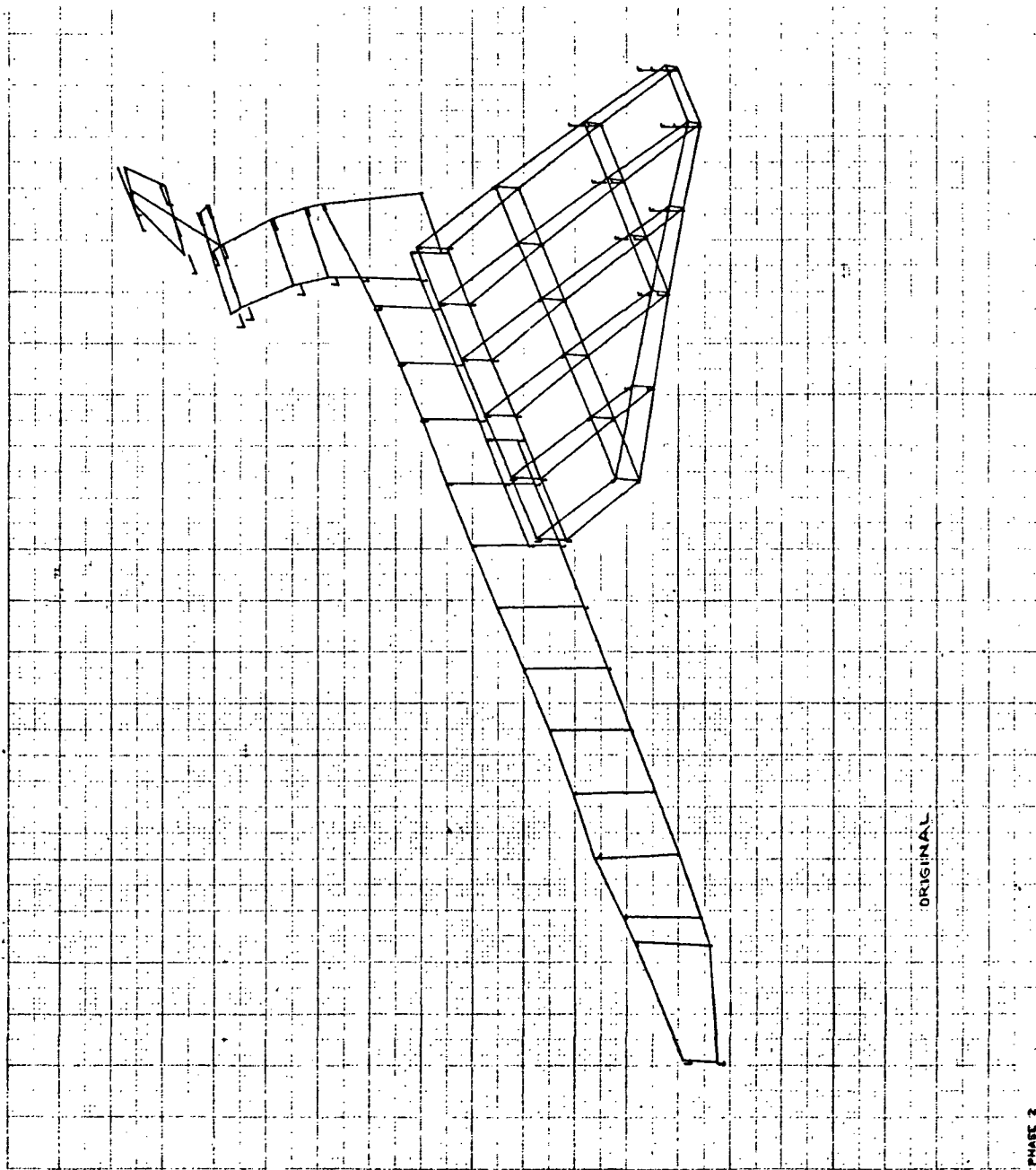
ORIGINAL

PHASE 2  
 ORBITER FROM CASE  
 FREE FREE MODES  
 MODAL DETOR. SUBCASE 1 MODE 5 FREQ. 02.0-023



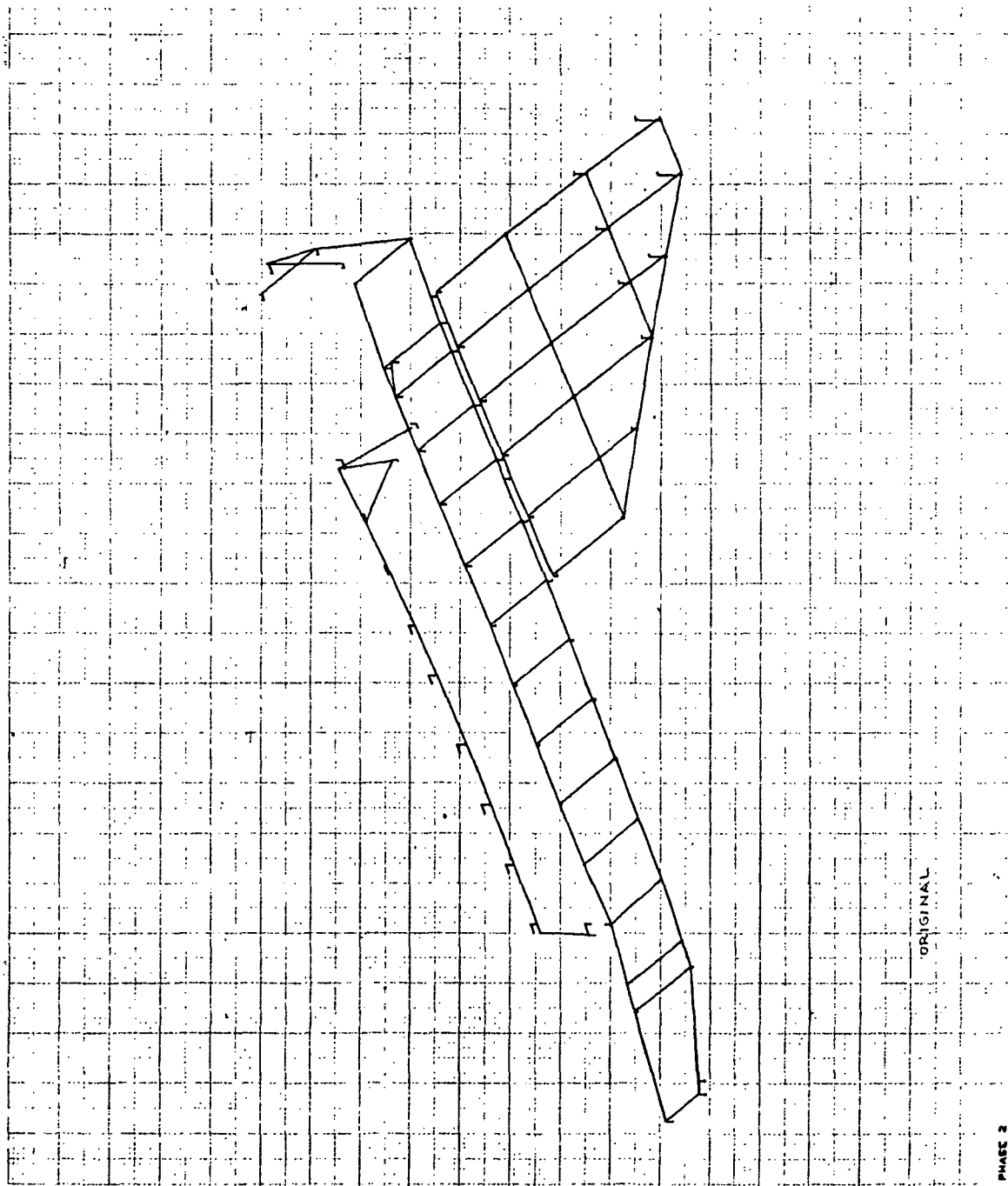
PHASE 2  
ORBITER SYMM CASE  
FREE FREE MODES  
MODAL DETOR. SUBCASE 1 MODE 6 FREQ. 82.64555

6 1/3/73 MAX-DEF. = 1.00000000

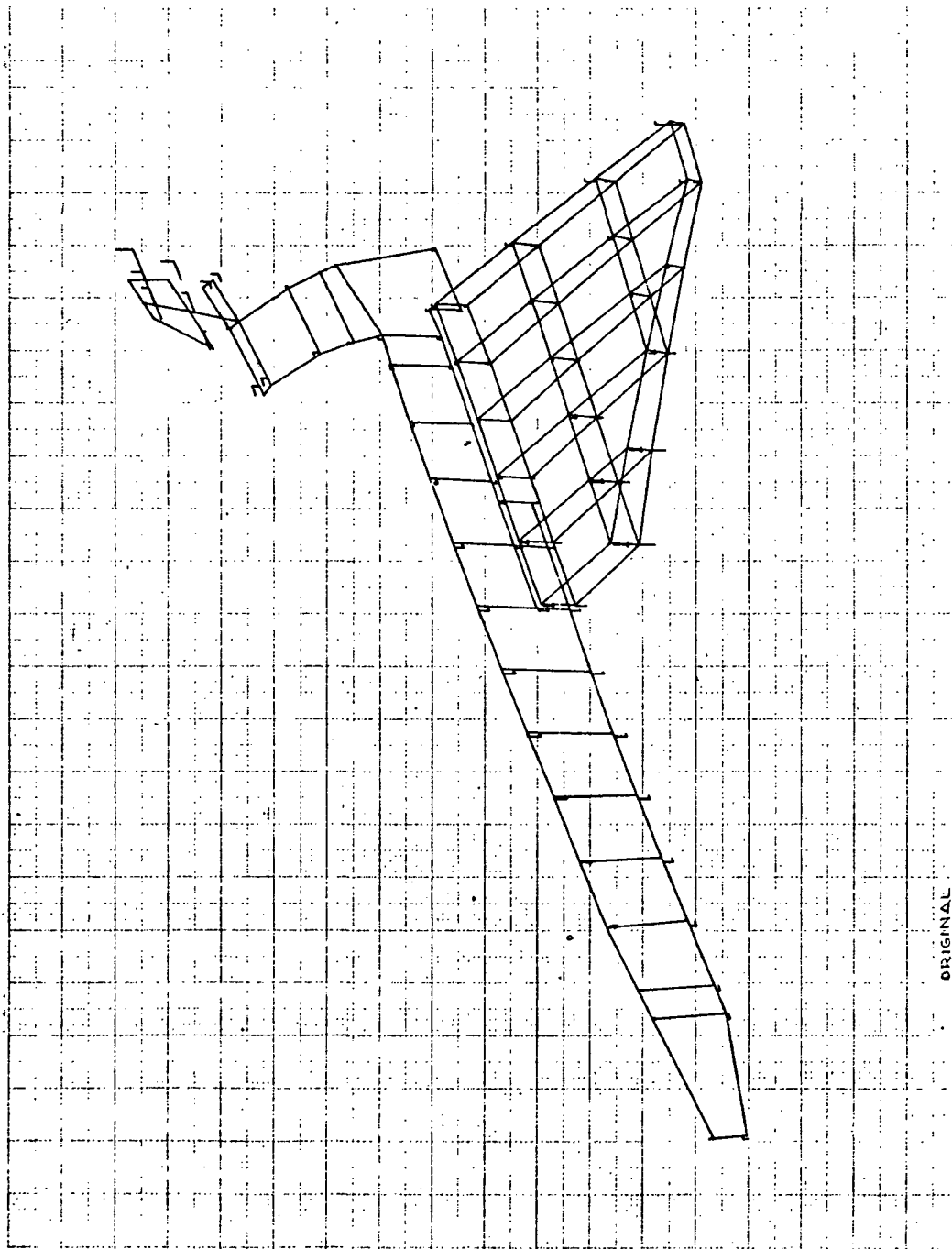


ORIGINAL

PHASE 2  
ORBITER SYM CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 1 MODE 6 FREQ. 75.18584



7 7/ 3/73 MAX-DEF. = 1.00000000



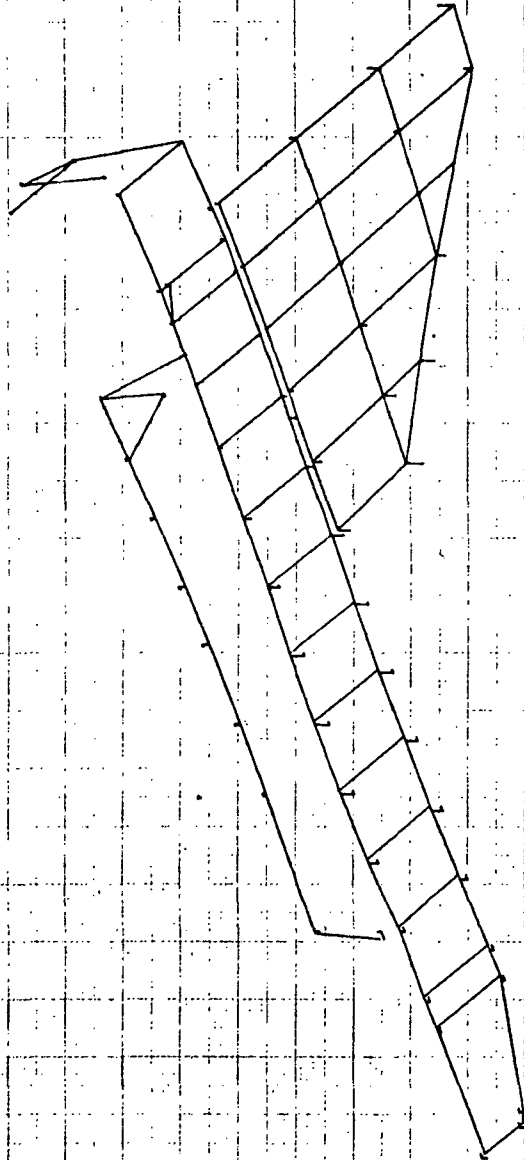
ORIGINAL

PHASE 2  
ORBITER SYMM CASE  
FREE FREE MODES  
ACQAL DEFOR. SUBCASE 1 MODE 7 FREQ. 109.6288



19 7/ 3/73 MAX-DEF. = 1.00000000

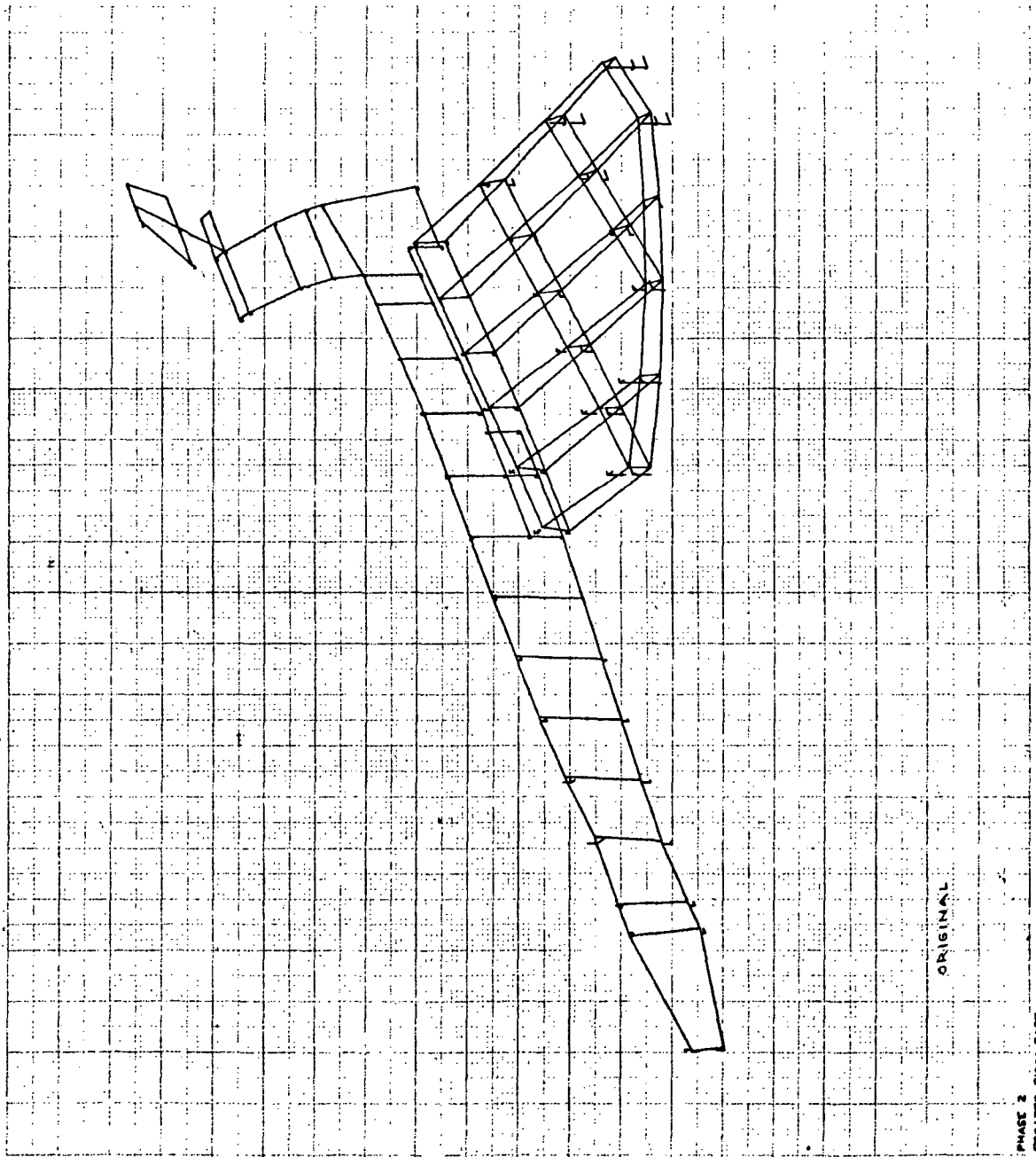
19



ORIGINAL

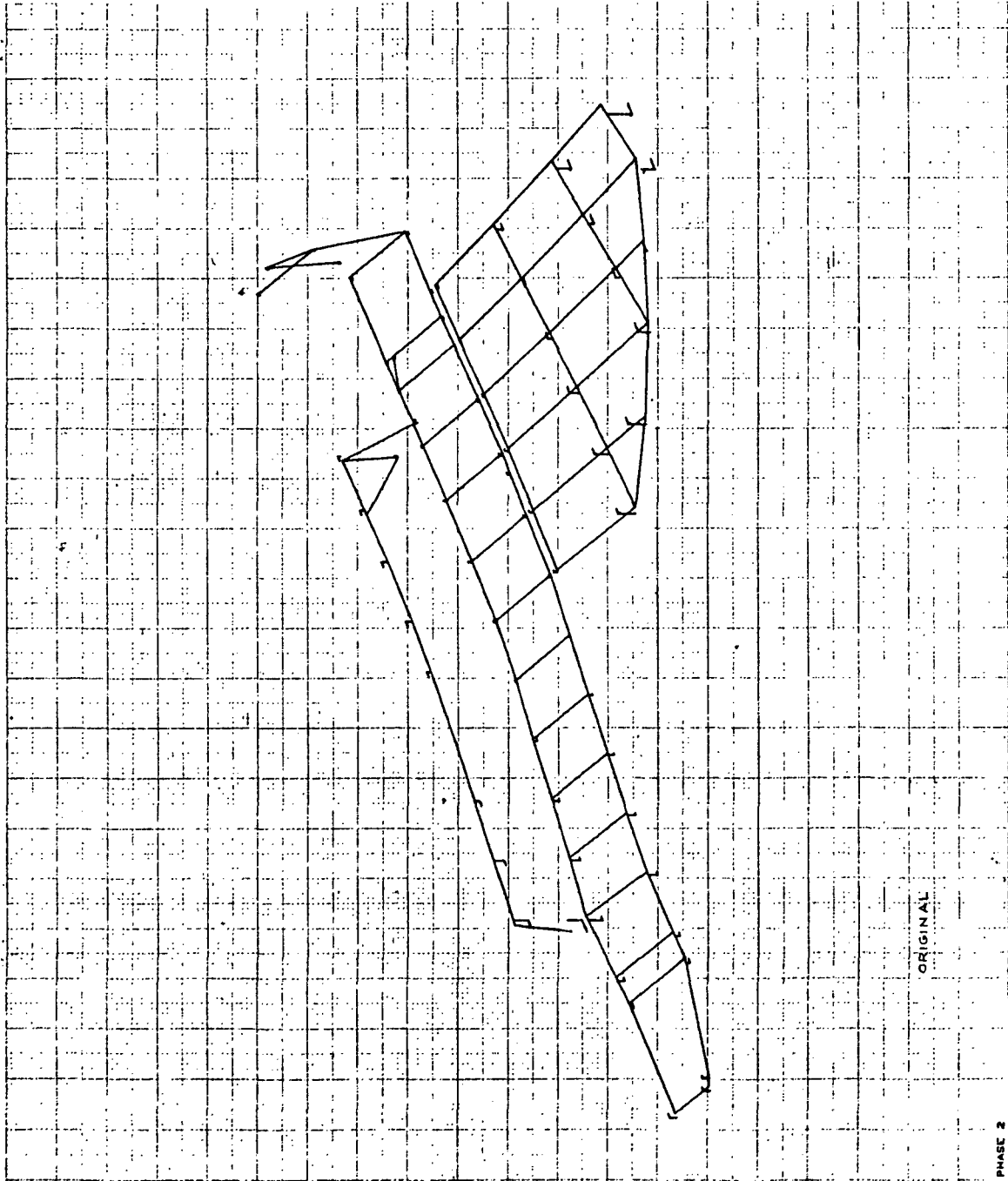
PHASE 2  
ORBITER SYMM CASE  
FREE FREE MODES  
MODAL DETOR. SUBCASE 1 MODE 7 FREQ. 108.5288

6 7/3/73 MAX-DEF. = 1.00000000

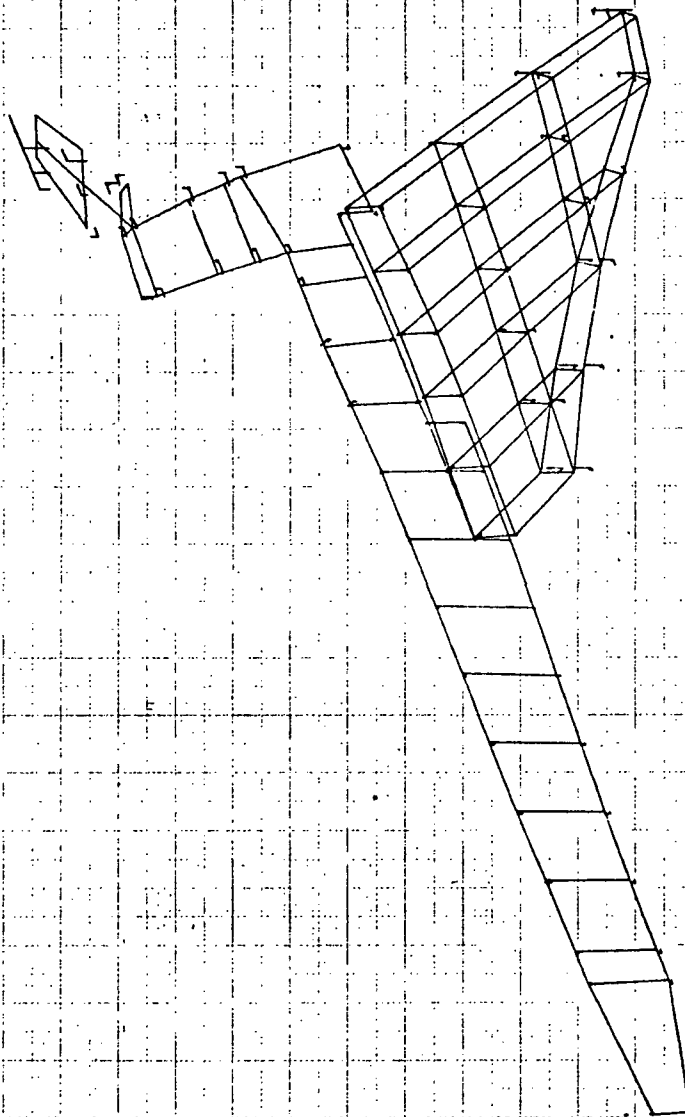


ORIGINAL

PHASE 2  
ORBITER SYMM CASE  
FREE FREE MODES  
MODAL DEFOR. SURFACE 1 MODE 8 FREQ. 133.7454

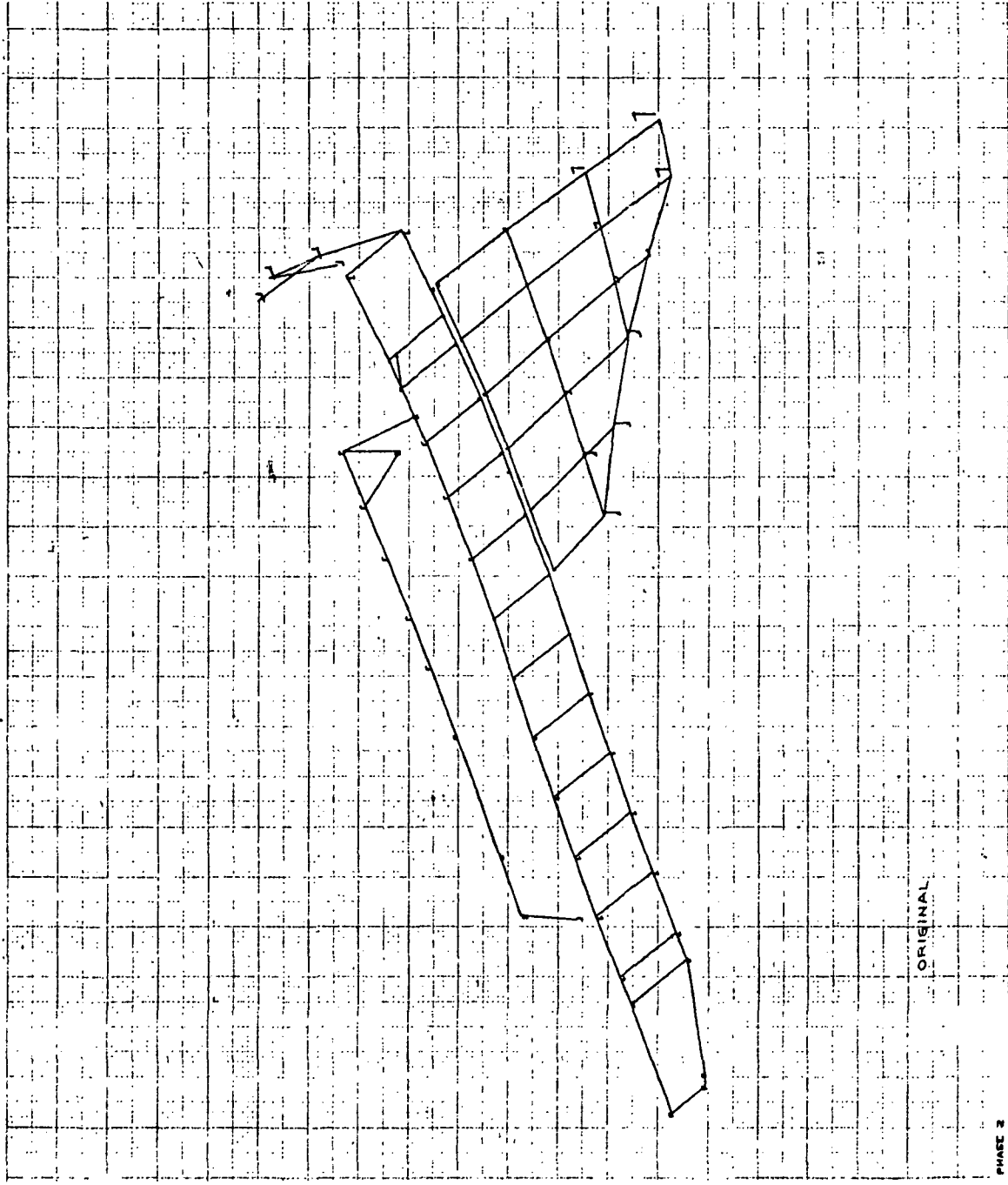


7/3/73 MAX-DEF. = 1.00000000

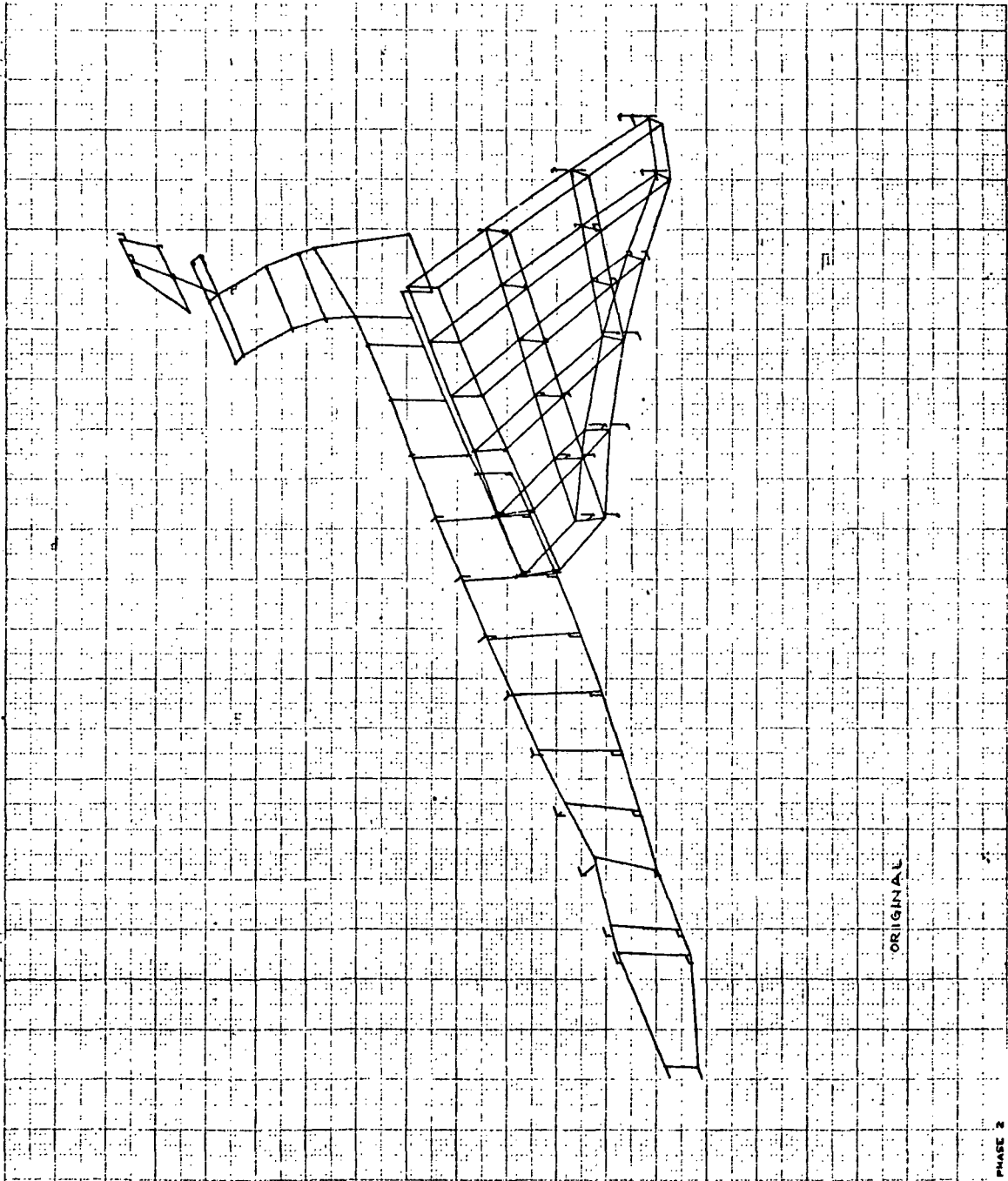


ORIGINAL

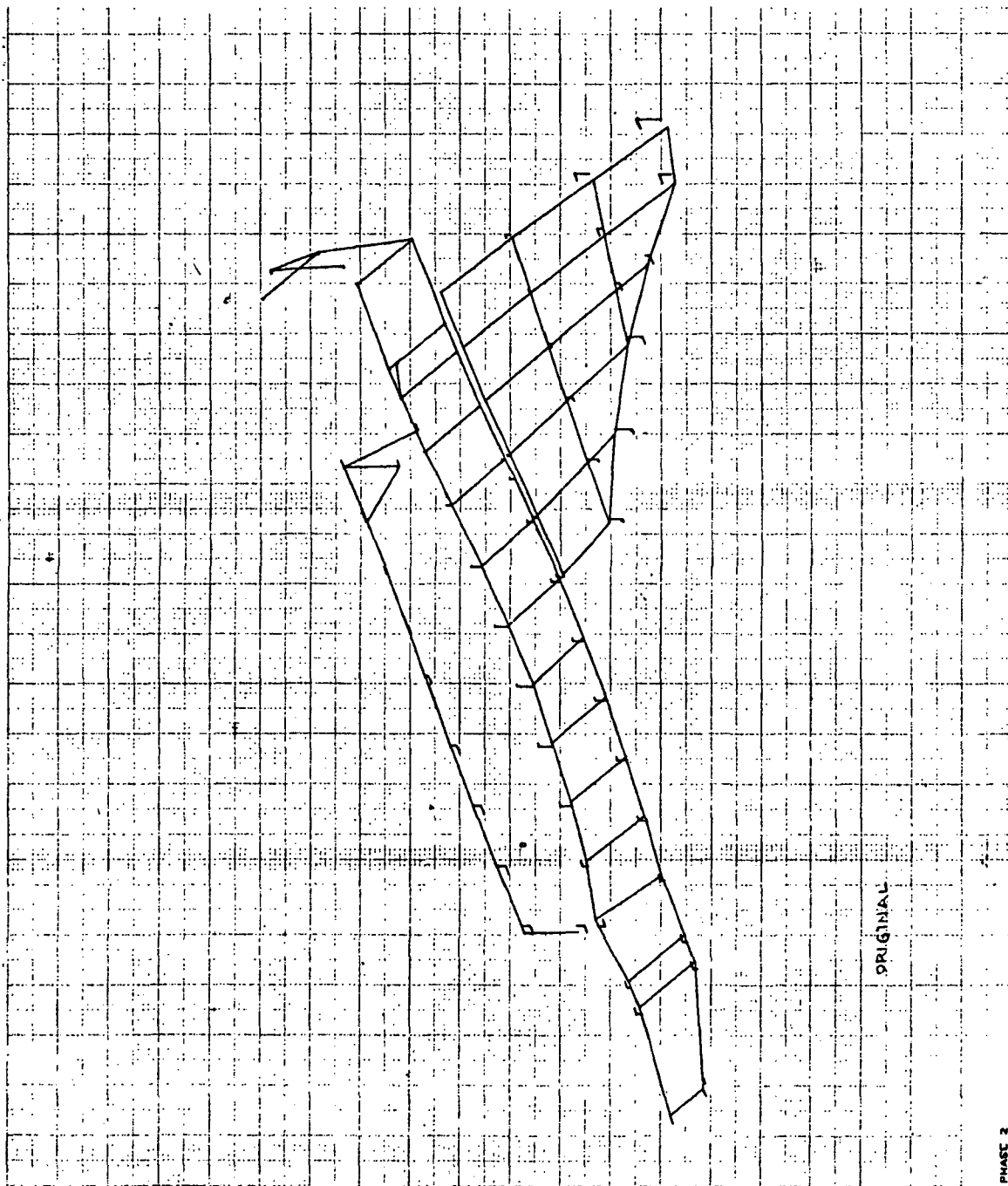
PHASE 2  
ORBITER SYMM CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 1 MODE 4 FREQ. 186.3176



PHASE 2  
 ORBITER SYM CASE  
 FREE FREE MODES  
 MODAL DEFOR. SUBCASE 1 MODE 19 FREQ. 159.3778



PHASE 2  
ORBITER SYMM CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 1 MODE 10 FREQ. 102.2401

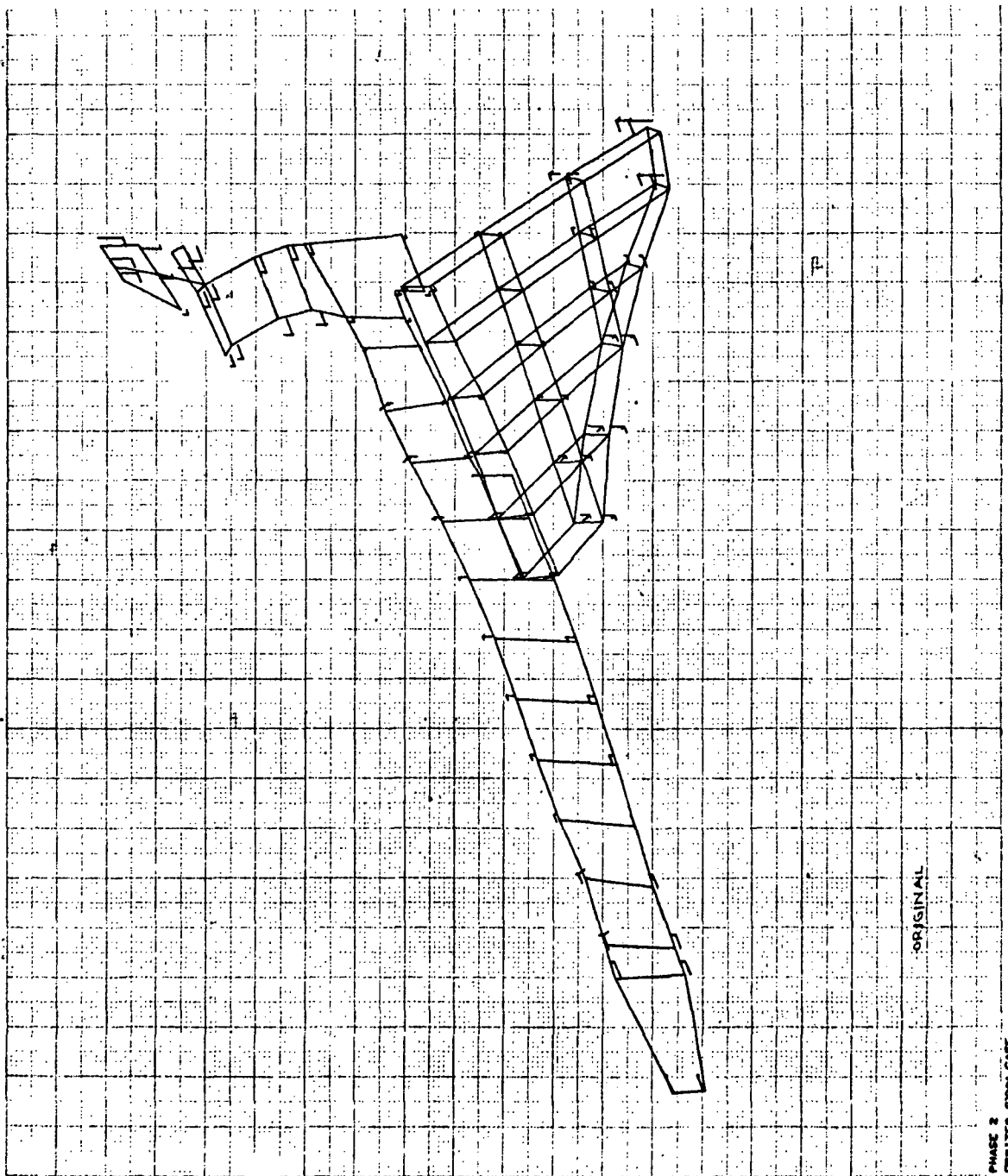


PHASE 2  
ORBITER SYMM CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 1 MODE 10 FREQ. 162.2401

11

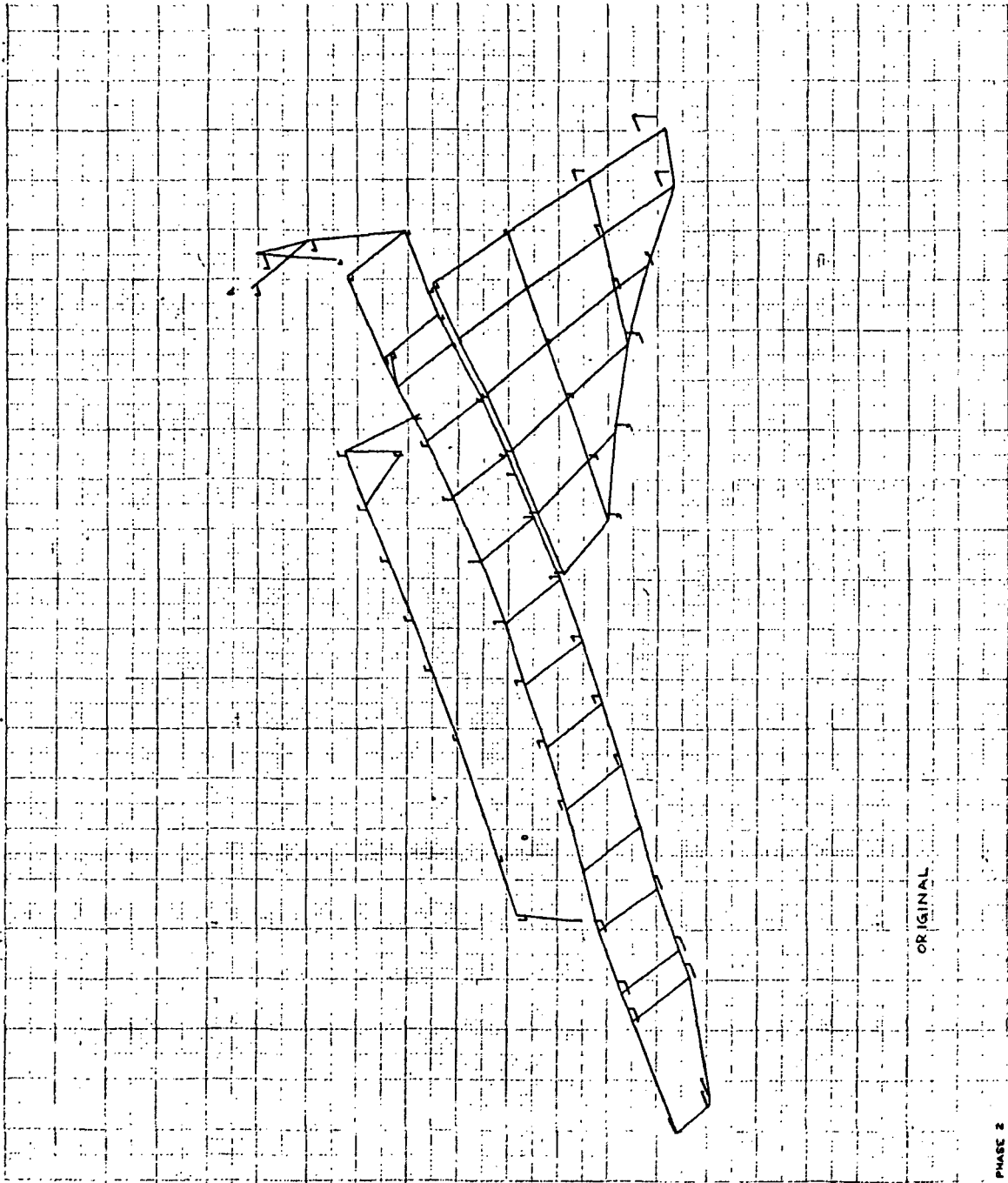
11 7/3/73 MAX-DEF. = 1.0840000

11



PHASE 2  
 ORBITER SYMM CASE  
 FREE FREE MODES  
 MODAL DEFOR. SURFACE 1 MODE 11 FREQ. 176.2848

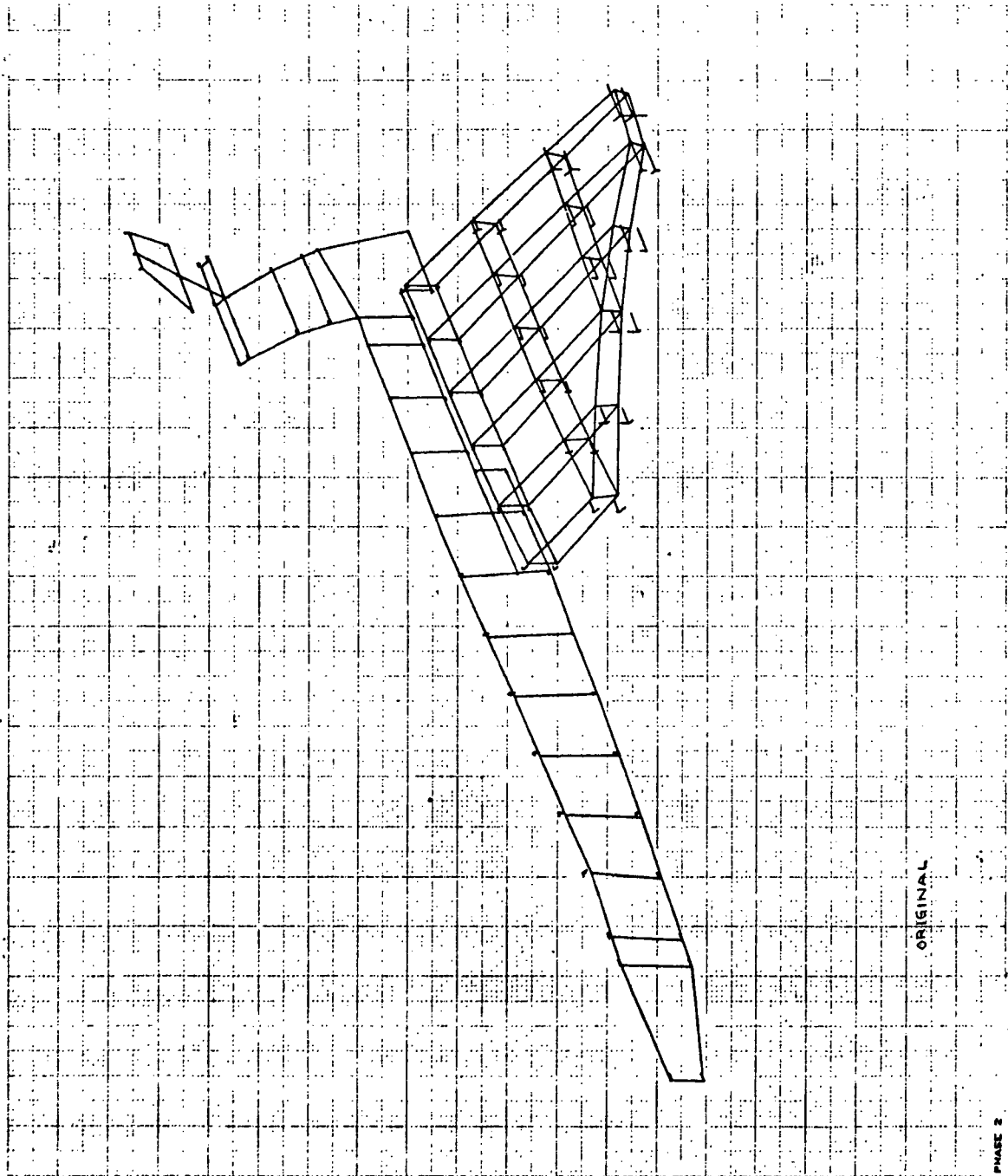




ORIGINAL

PHASE 2  
ORBITER SYMM CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 1 MODE 11 FREQ. 176.2848

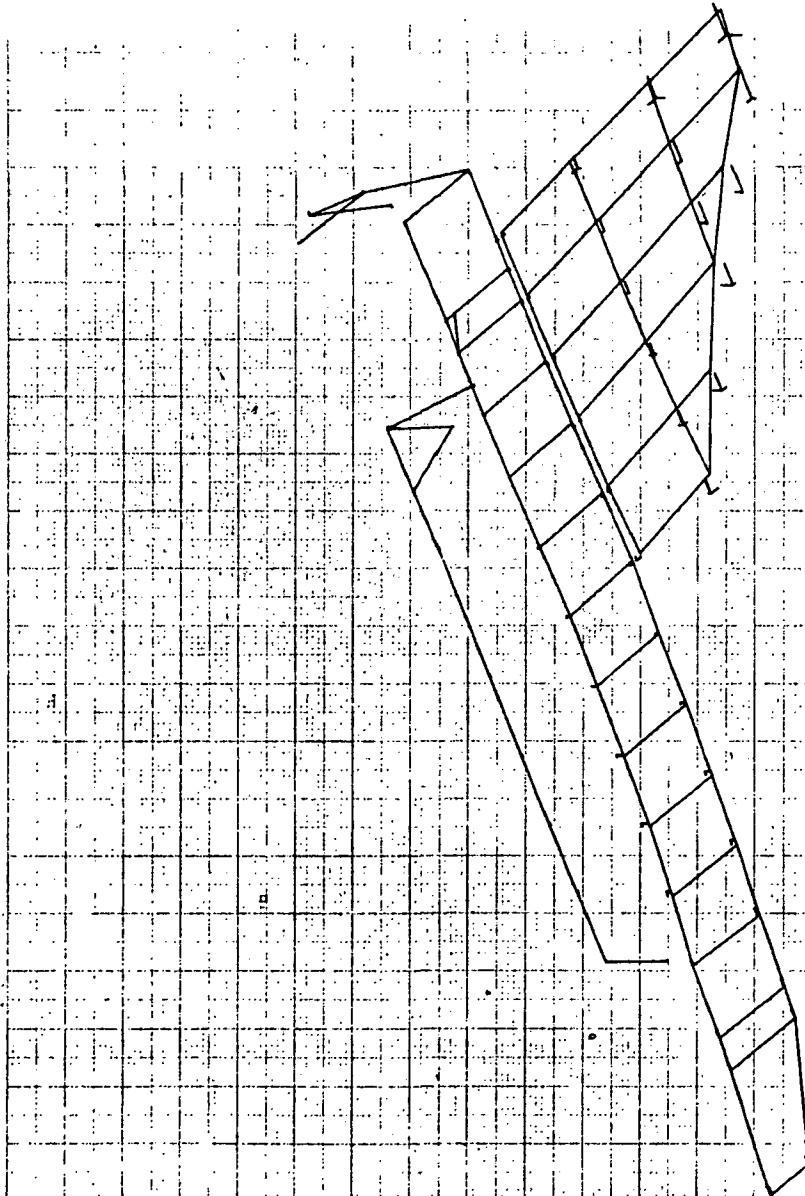
12 1/ 3/73 MAX-DEF. = 1.00000000



ORIGINAL

PHASE 2  
ORBITER SYMM CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 1 MODE 12 FREQ. 216.4897

24 1/2/73 MAX-DEF. = 1.00000000

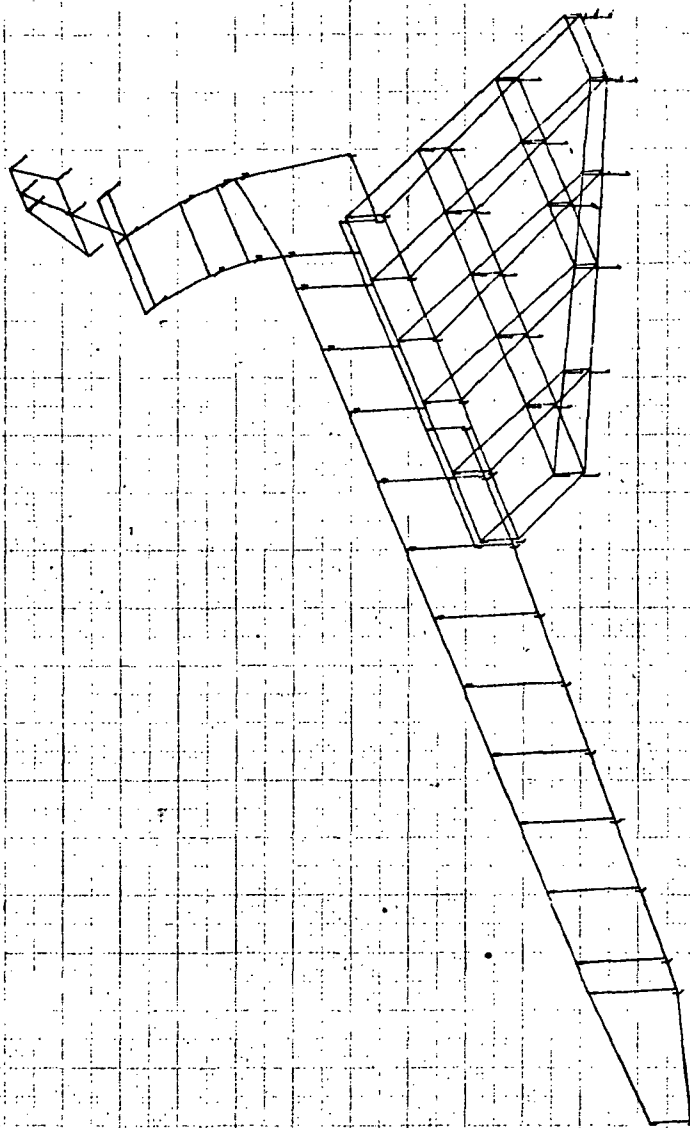


ORIGINAL

PHASE 2  
ORBITER SYMM CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 1 MODE 12 FREQ. 216.4897

**Appendix B20**  
**PLOTS OF ANTISYMMETRIC FREE-FREE MODES**  
**PHASE 2 ANALYSIS – MODEL 1 ORBITER**

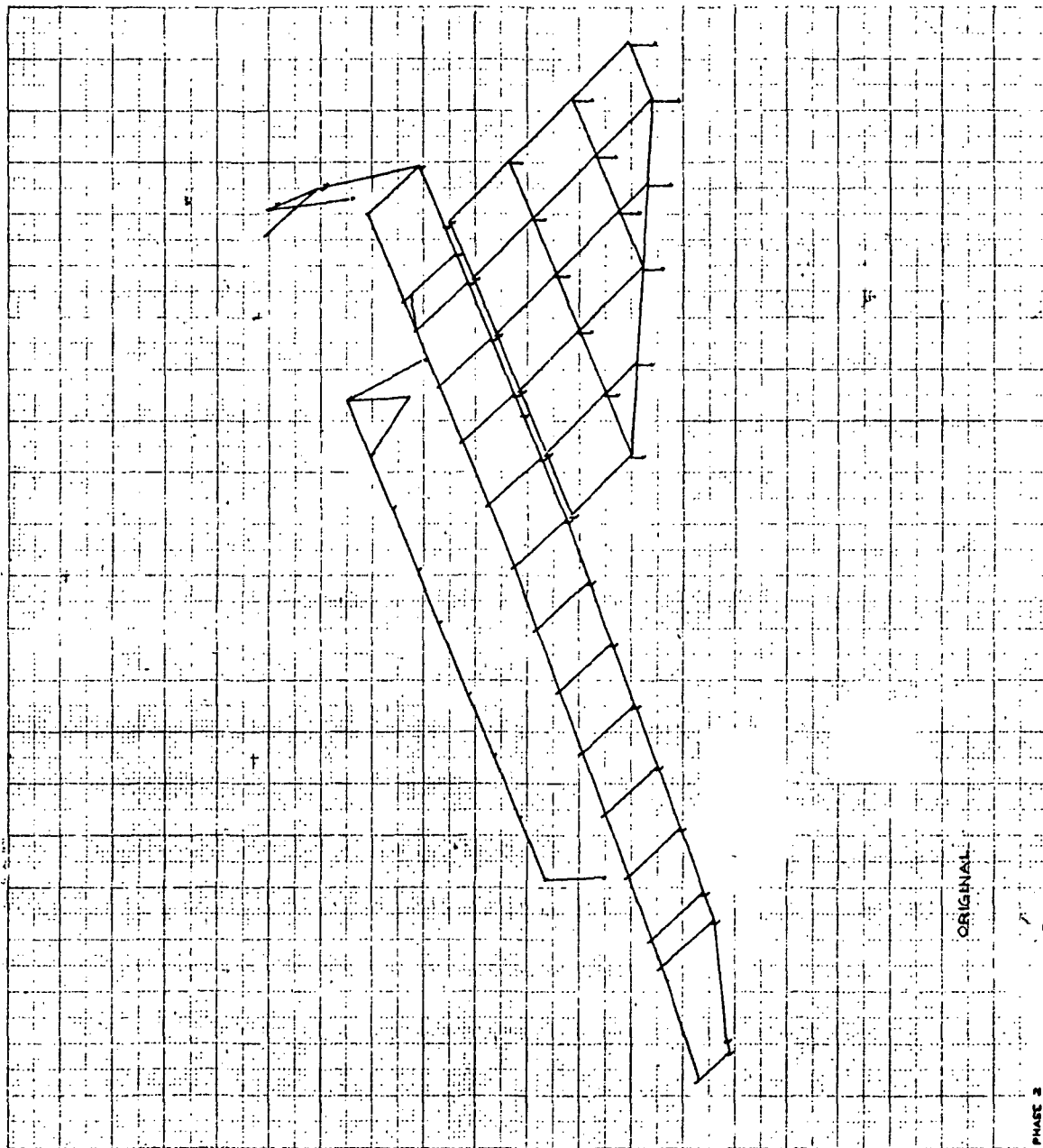
7/ 2/73 MAX-DEF. = 1.00000000



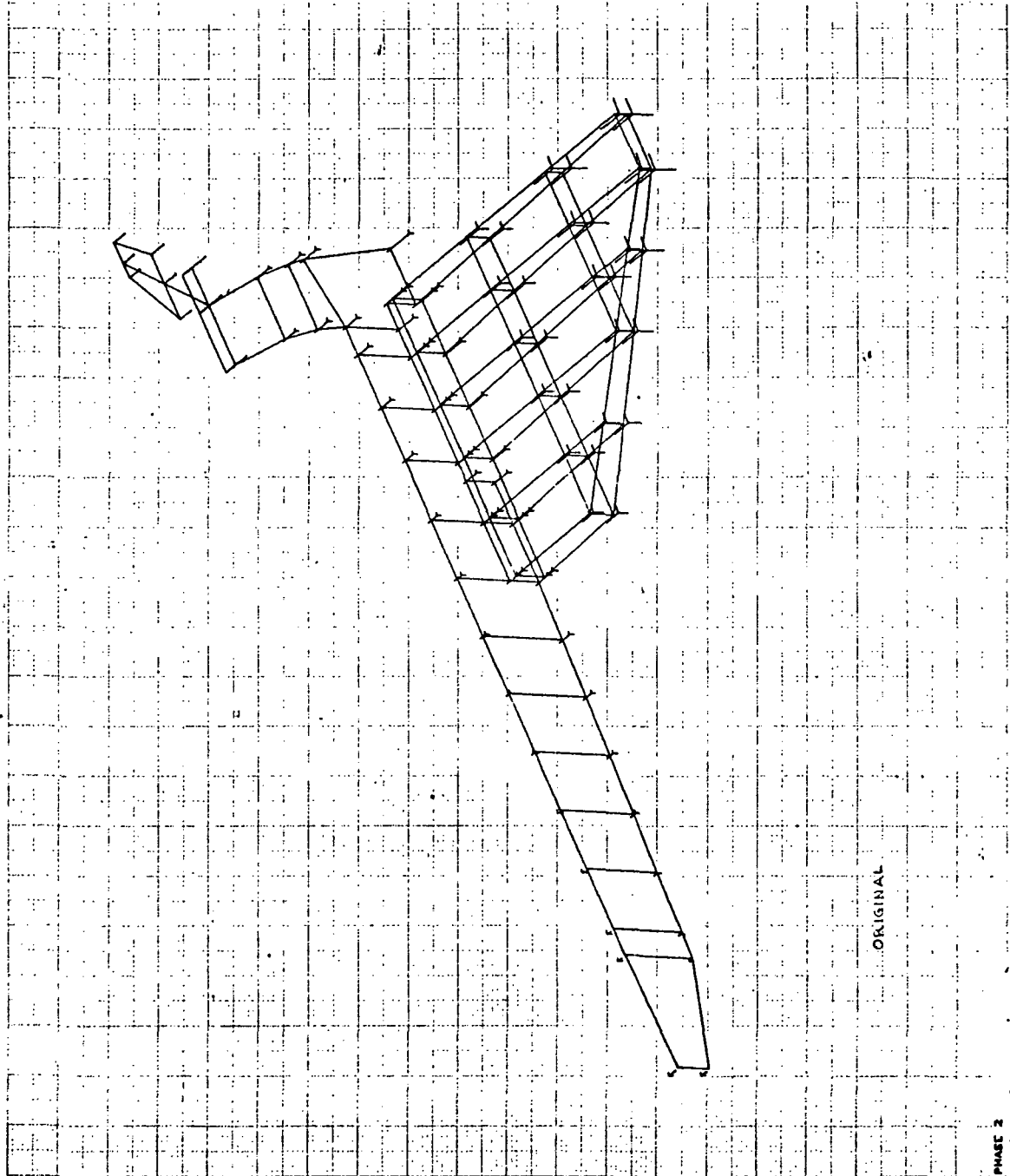
ORIGINAL

PHASE 2  
ORBITER ANTI CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 1 MODE 1 FREQ. 0.

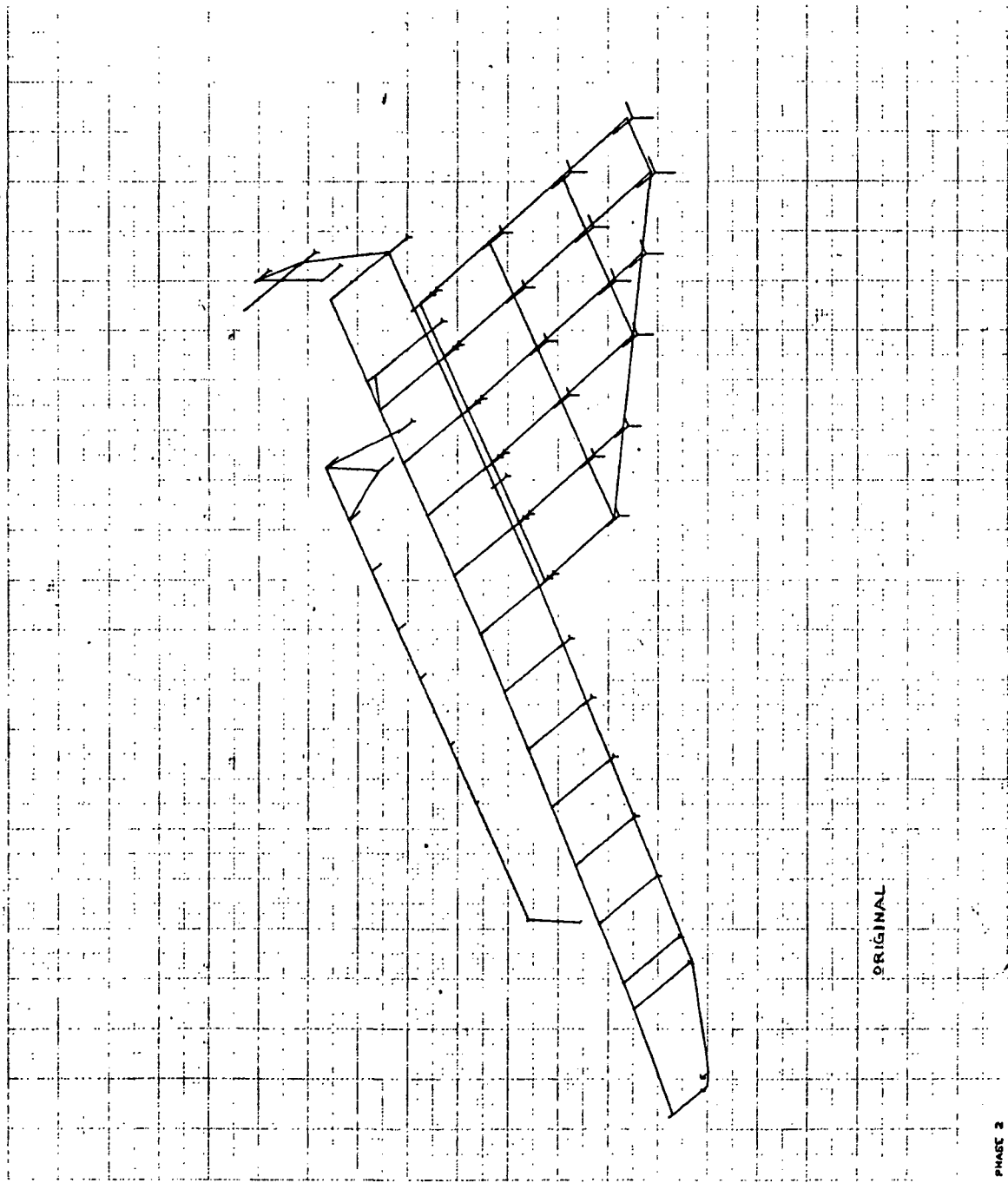
10 7/2/73 MAX-DEF. = 1.00000000



PHASE 2  
ORBITER ANTI CASE  
FREE FREE MODES  
MODAL DEFON. SUBCASE 1 MODE 1 FREQ. 0.



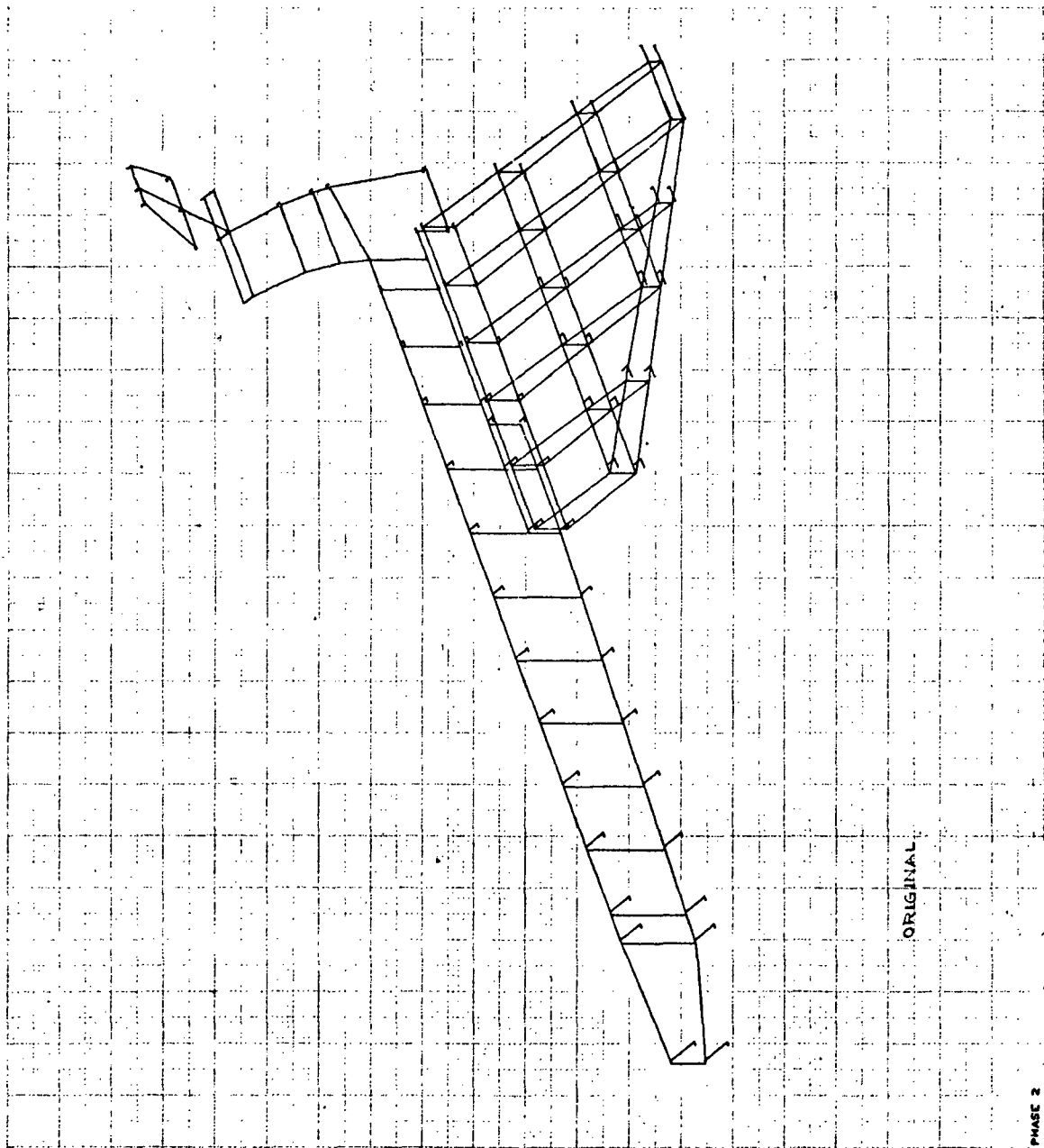
PHASE 2  
ORBITER AMT1 CASE  
FREE FREE NODES  
MODAL DEFOR. SURCASE 1 MODE 2 FREQ. 0.



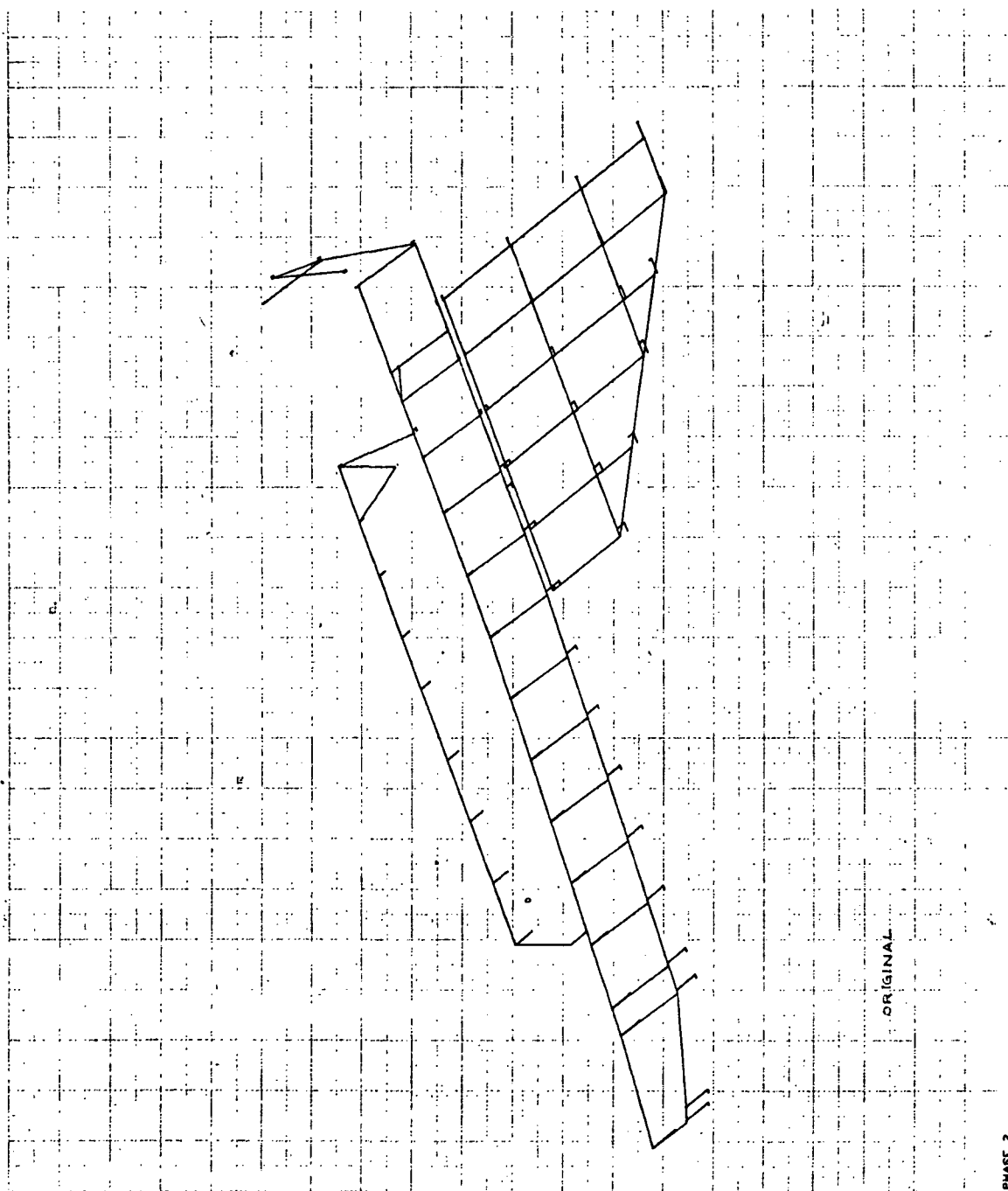
PHASE 2  
ORBITER ANY1 CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 1 MODE 2 FREQ. 0.



3 7/ 2/73 MAX-DEF. = 1.0000000

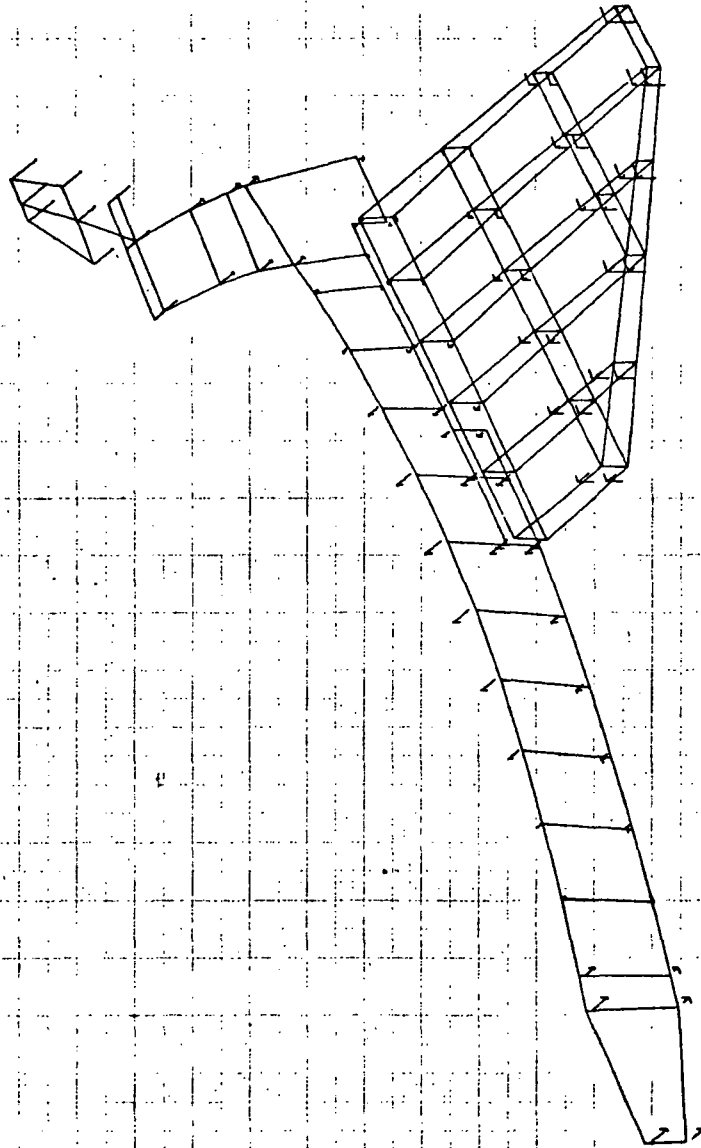


PHASE 2  
ORBITER ANT1 CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 1 MODE 3 FREQ. 0.



PHASE 2  
 ORBITER AMT1 CASE  
 FREE FREE MODES  
 MODAL DEFOR. SUBCASE 1 MODE 3 FREQ. 0.

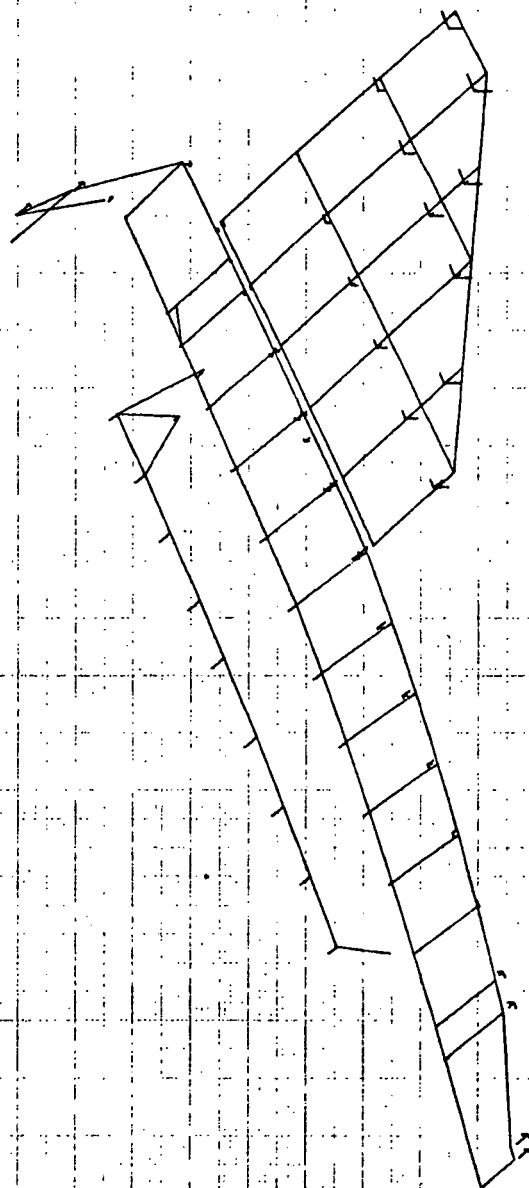
4 7/ 2/73 MAX-DEF. = 1.00000000



ORIGINAL

PHASE 2  
ORBITER AMT1 CASE  
FREE FREE MODES  
MODAL DEFON. SUBCASE 1 MODE 4 FREQ. 82.86078

13 7/2/73 MAX-DEF. = 1.00000000



ORIGINAL

PHASE 2  
ORBITER ANTI CASC  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 1 MODE 4 FREQ. 62.65078

8 1/2/73 444-007. 1.00000000

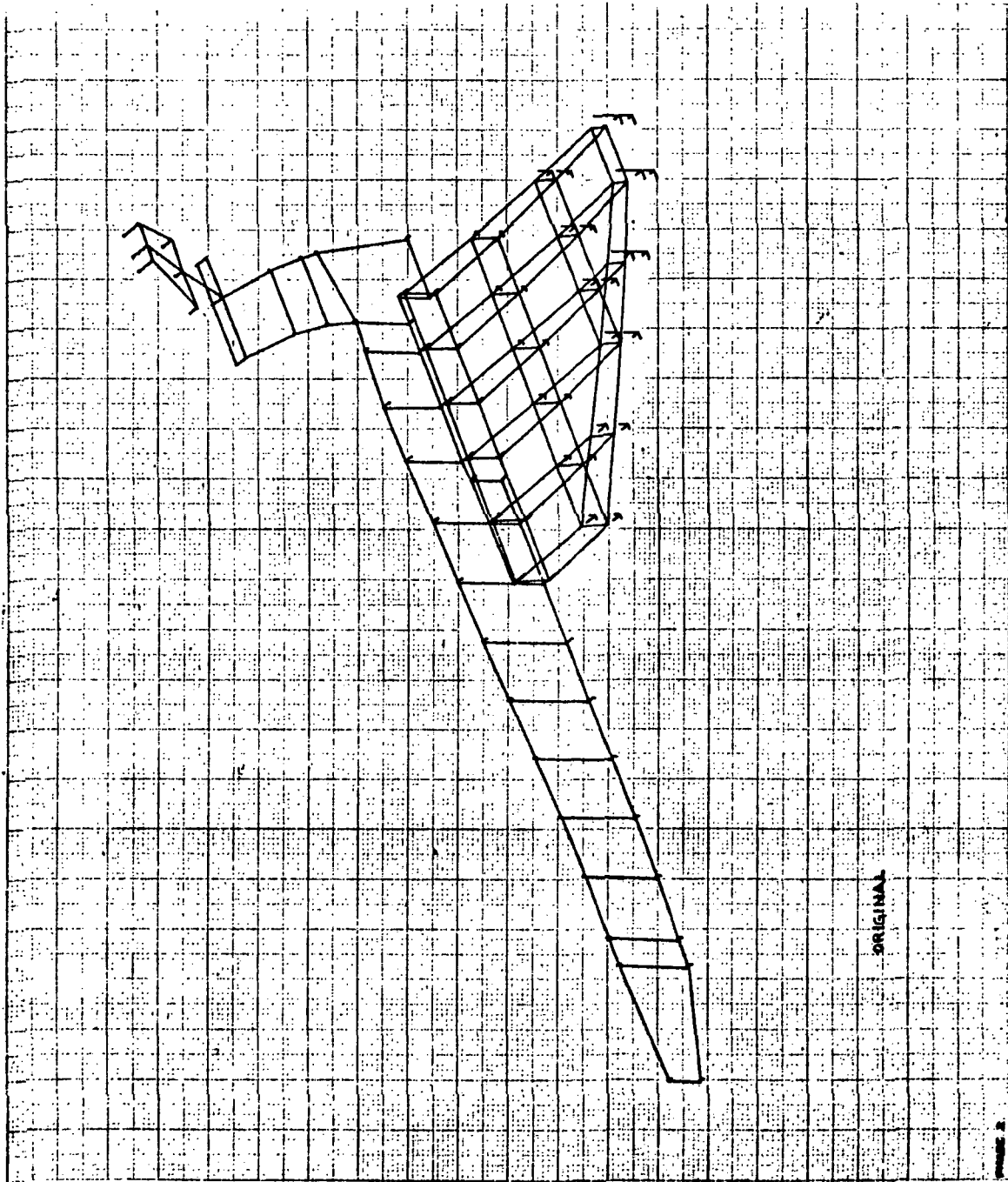
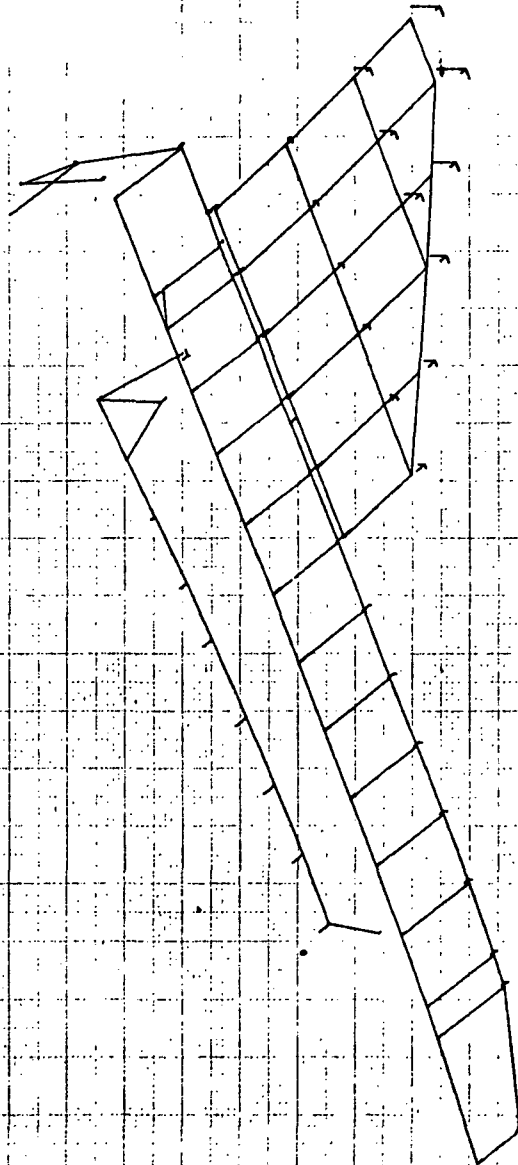


FIGURE 2  
SECTION 4471 CASE  
FILE 4471-4203  
4471-4203. SUBCASE 1. 4471-4203. 11.000000

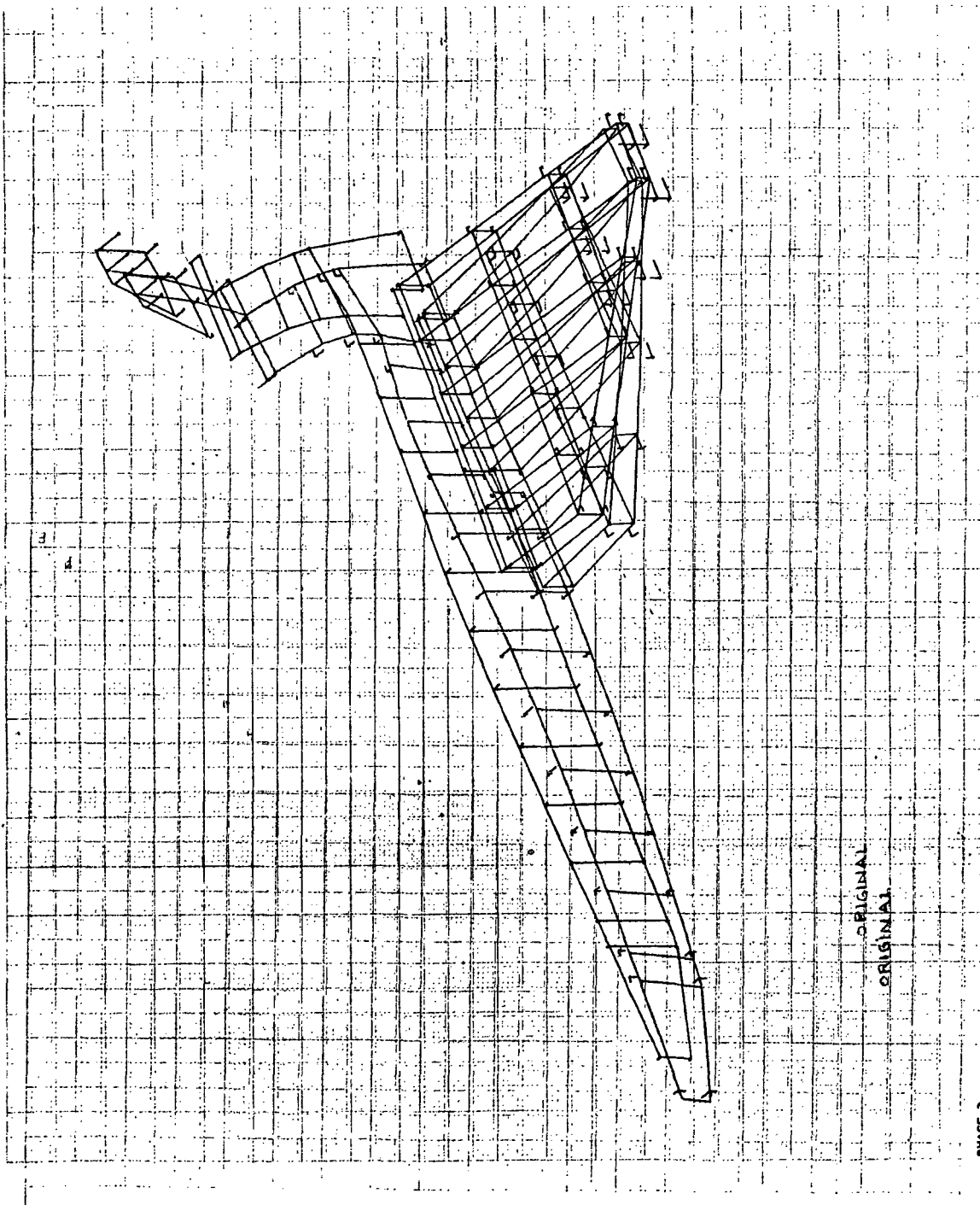
14 1/2/72 MAX-DEF. = 1.00000000



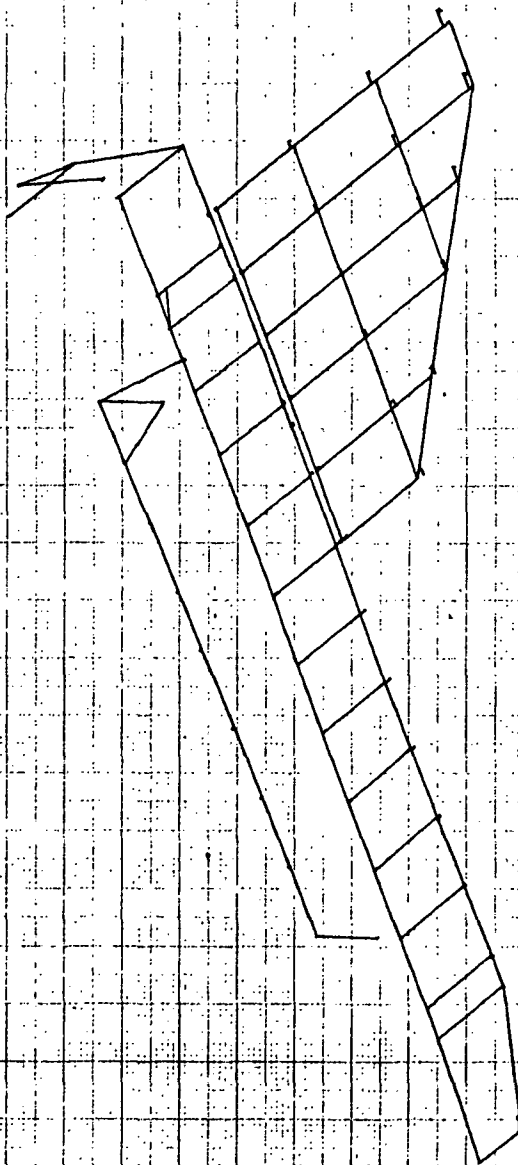
ORIGINAL

PHASE 2  
ORBITER ANTI CASE  
FREE FREE MODES  
MODAL DEFOR. SURFACE 1 MODE 6 FREQ. 72.55952

6 7/ 2/73 MAX-DEF. = 1.0000000  
 7 7/ 2/73 MAX-DEF. = 1.00073470



PHASE 2  
 PHASE 2: AFTER ANTI CASE  
 ORBITAL CASES  
 FREE VIB. DEF. SUBCASE 1 MODE 6 FREQ. 86.12134  
 MODAL DEF. SUBCASE 1 MODE 7 FREQ. 81.97059

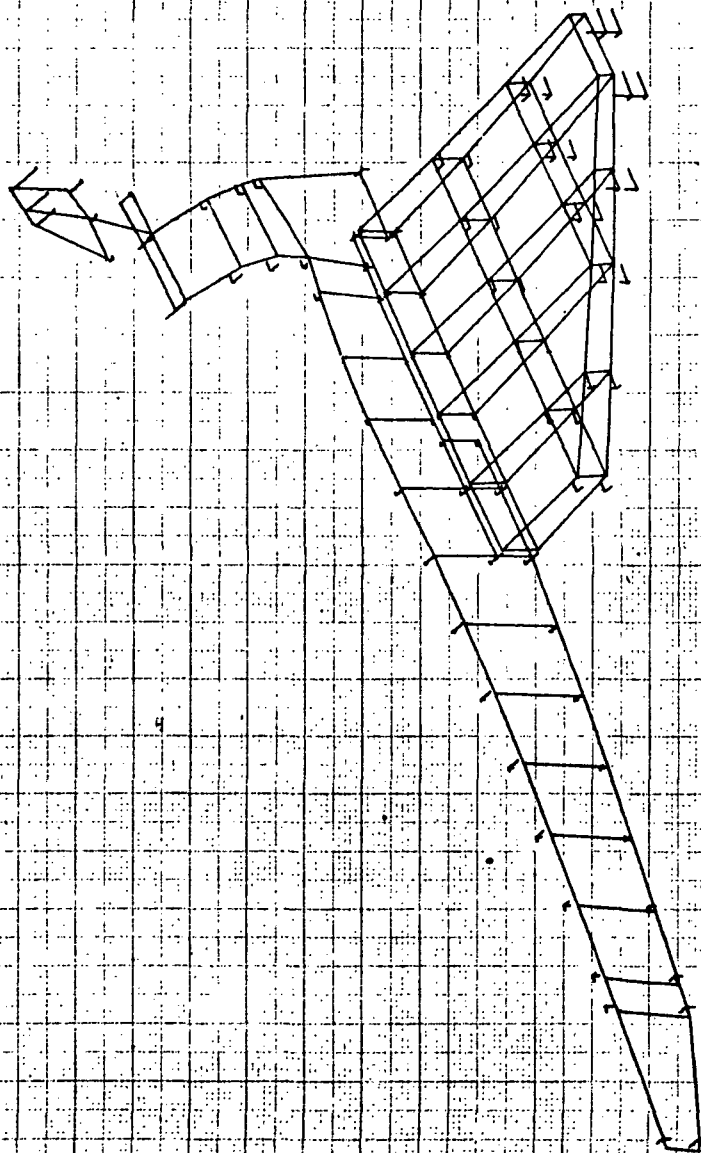


ORIGINAL

PHASE 2  
ORBITER ANT1 CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 1 MODE 6 FREQ. 85.12134



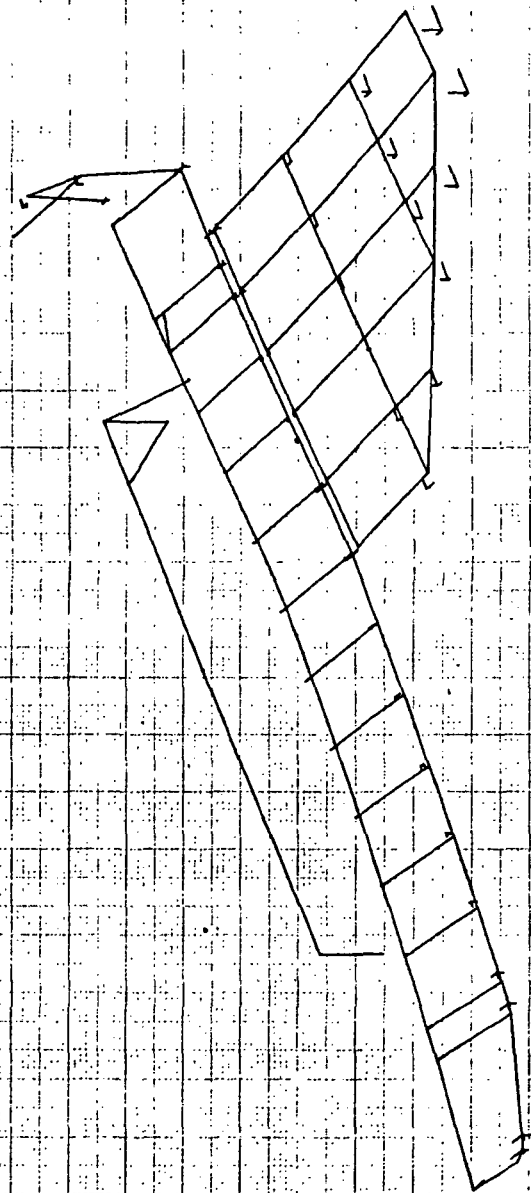
7 1/2/73 MAX-DEF. = 1.0673170



ORIGINAL

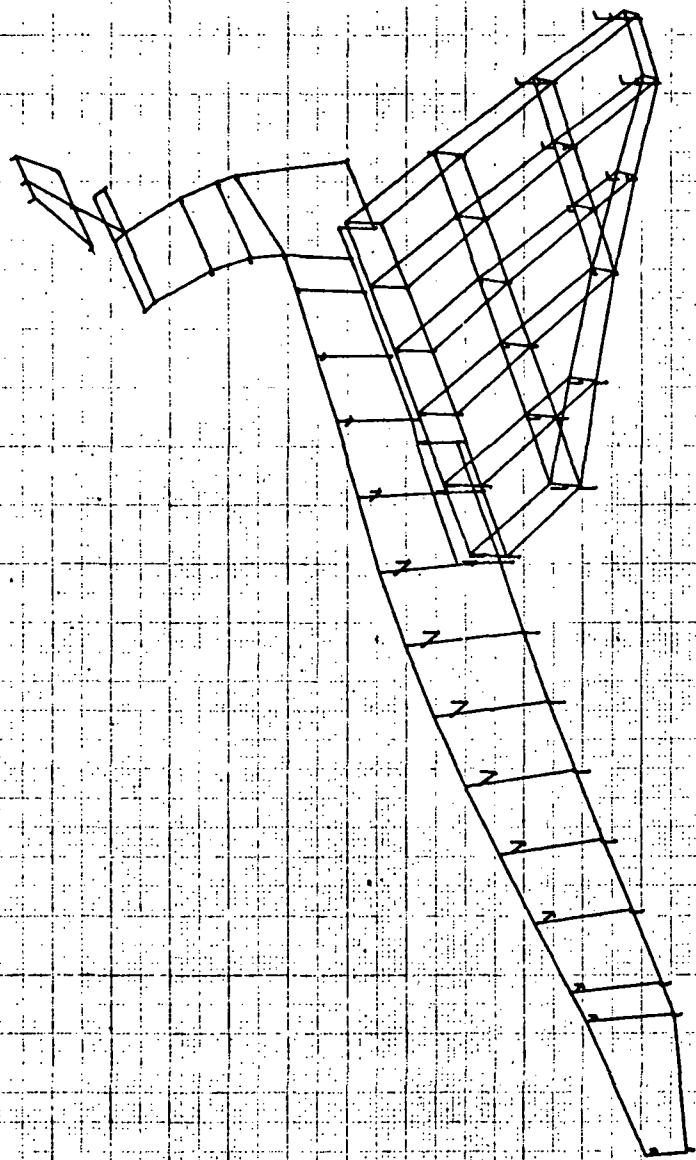
PHASE 2  
ORIGINAL AMT. CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 1 MODE 7 FREQ. 31.47883

16 7/ 2/73 MAX-DEF. = 1.06073470



ORIGINAL

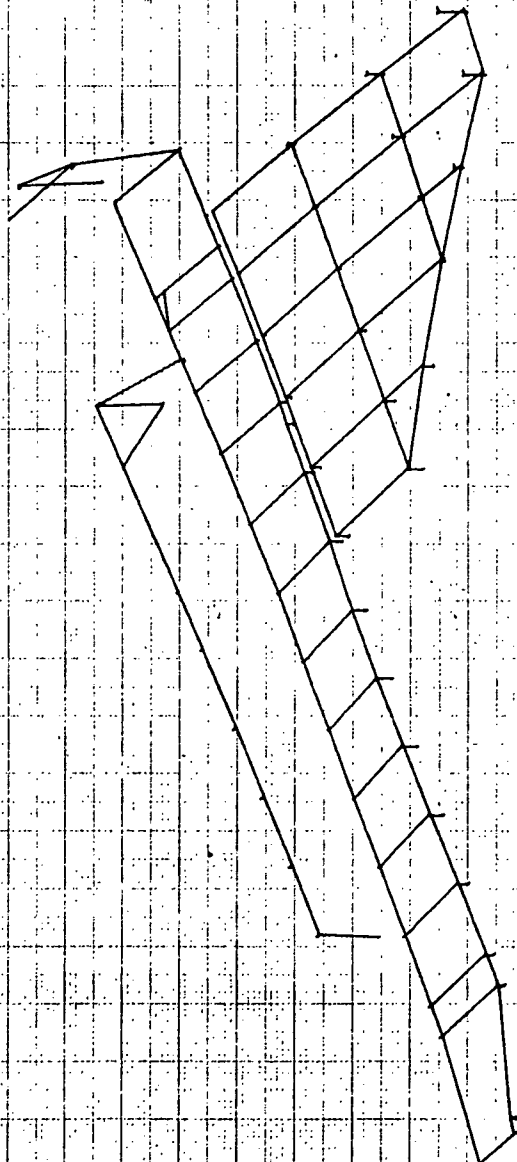
PHASE 2  
ORBITER ANT1 CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 1 MODE 7 FREQ. 31.97656



ORIGINAL

PHASE 2  
ORBITER ANTI CASE  
FREE FREE MODES  
MODAL DEFOR, SUBCASE 1 MODE 8 FREQ. 101.6175

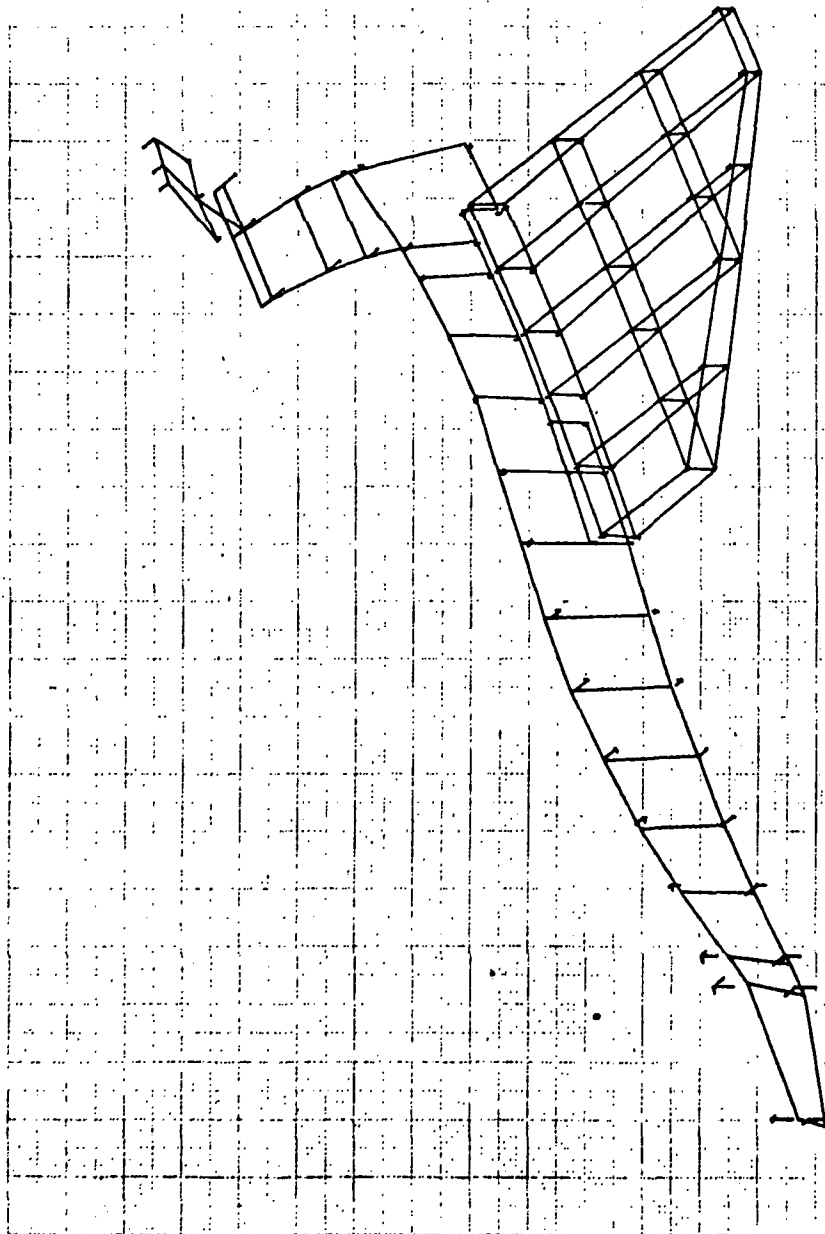
17 7/2/73 MAX-DEF. = 1.00000000



ORIGINAL

PHASE 2  
DRIFTER ANTI CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 1 MODE 8 FREQ. 101.6175

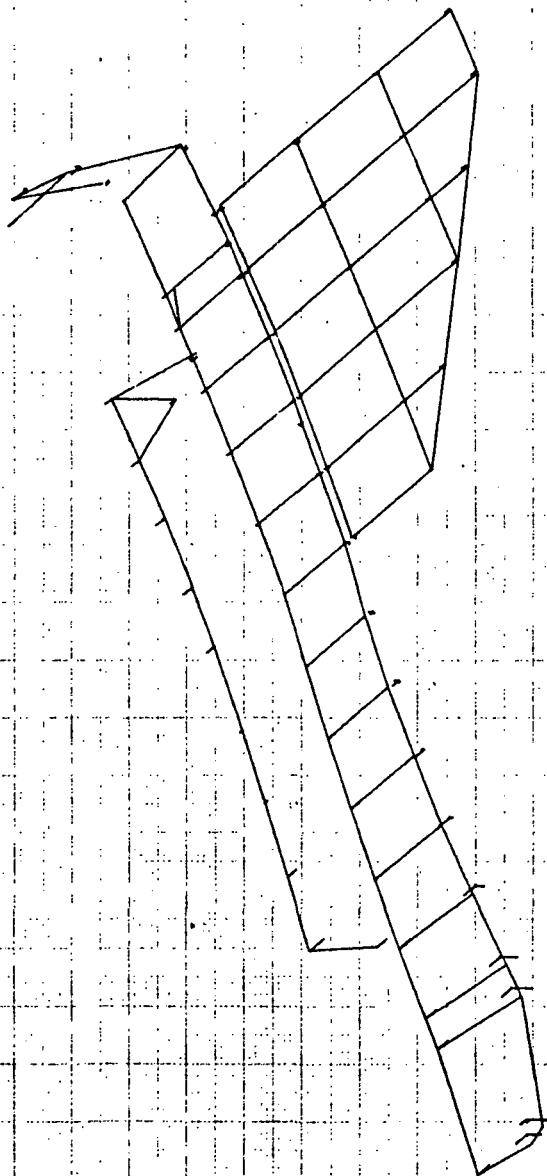
7/ 2/73 MAX-DEF. = 1.26051900



ORIGINAL

PHASE 2  
ORBITER INT'L CASE  
FREE FREE EDGES  
MODAL TESTOR. SUBCASE 1 MODE 9 / FREQ. 136.2871

18 7/ 2/73 MAX-DEF. = 1.36051400



ORIGINAL

PHASE 2  
ORBITER ANTI CASE  
FREE FREE MODES  
MODAL DEFOR. SUBCASE 1 MODE 9 FREQ. 136.2877

Specimen Config.: IC  
 Excitation: Axial-P1  
 Payload Sensor: Mid-Span of Tube  
 Damping: SFD Empty & Filled

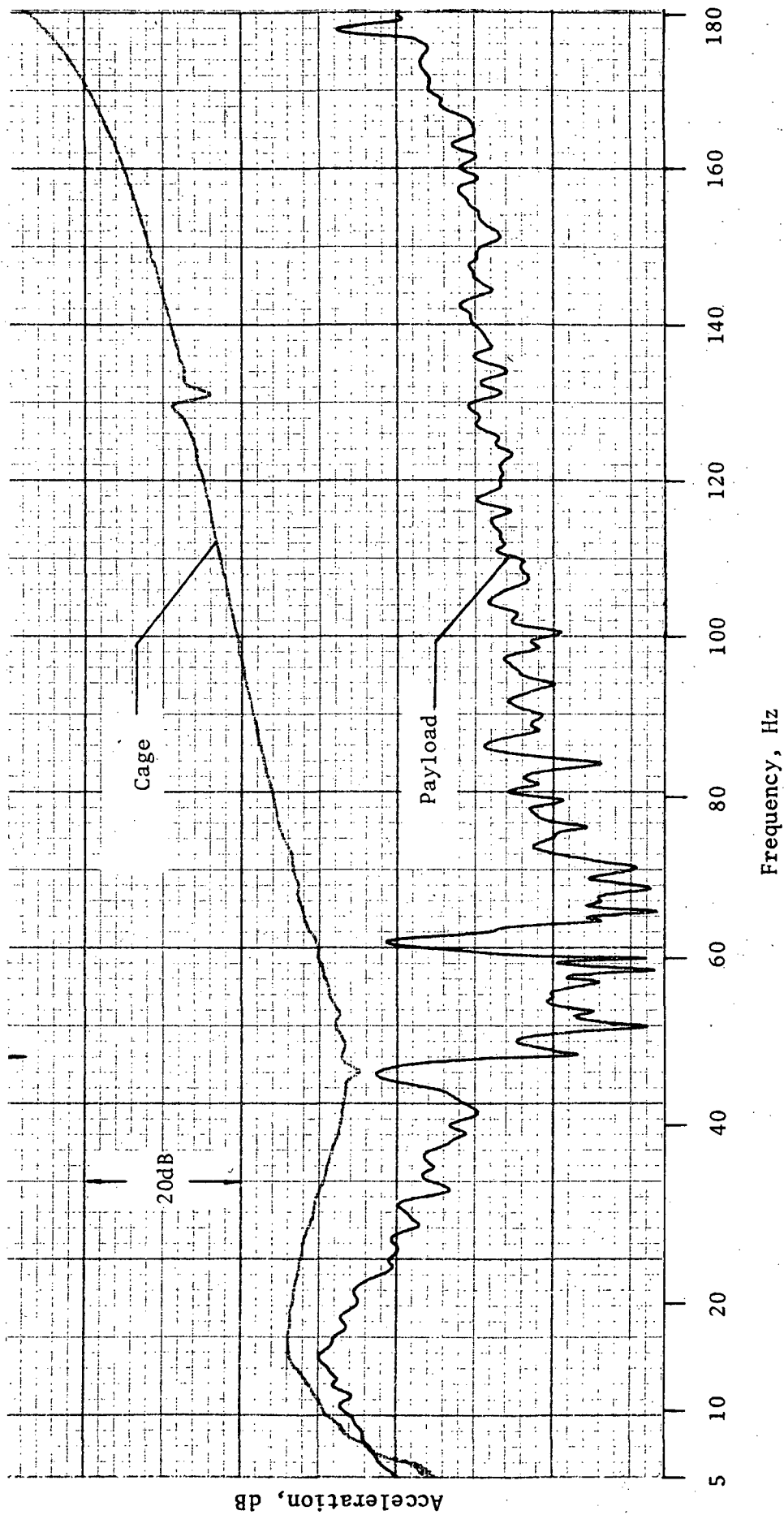


Figure 49-2 Test IIN, With Damping

the logarithm of the acceleration amplitude by the SD121 Tracking Filter. The frequency response plot is, therefore, directly in dB. The frequency response of the Payload was then obtained in an identical manner. Isolation system performance can be directly measured from the frequency response curves as the dB difference between the accelerations measured on the Cage Structure and on the Payload.

The relative velocity response curves provide measurements of the effectiveness of the active dampers at low (rigid-body) frequencies.

#### 6.2.5 Test Results and Discussion

Phase II test results contain some 25 sets of frequency sweep curves. Fifteen of these have been selected and are presented in this report (Figures 37-51) as basis of partial evaluation of the isolation system.

As discussed previously, the purpose of the suspension system is to isolate the Payload from the vehicle at high frequencies. The performance of the suspension system is, therefore, to be evaluated at high frequencies.

Detailed investigation of Figures 37, 38, and 39 reveal that with the squeeze-film damper empty, the reduction of acceleration level from the Cage Structure to the Payload is nearly always by an amount greater than 20 dB for frequencies above 50 Hz. The only exception was observed at 240 Hz where the Cage Structure went through a notch (or anti-resonance) and the Payload was actually vibrating more over a 3 to 5 Hz frequency band. It may, therefore, be concluded that the suspension system design goals have been achieved in the longitudinal direction for the two static preload conditions investigated.



When the squeeze-film dampers were functioning (i.e., when they were filled with grease), the performance of the suspension system was reduced. A comparison of frequency response curves of Figure 38 (SFD non-functioning) with those of Figure 39 (SFD functioning) indicates that:

- (a) The degree of isolation is not as good with SFD functioning. Using tests II B-2 and II C-2 as examples, at 800 Hz where all frequency response curves are relatively "smooth" (i.e., where there are no peaks or notches), the SFD reduced the degree of isolation from 28 dB to 18 dB. Again at 2,000 Hz the reduction was from 70 dB to 20 dB.
- (b) The SFD increased the number of notches on the Cage Structure. Consequently, there are a greater number of narrow frequency bands over which the Payload vibrated more than the Cage Structure.
- (c) For the same excitation, acceleration levels on both the Cage Structure and the Payload were reduced by the functioning SFD

The performance of the suspension system in the 1-3 direction can be determined by similar examination of frequency response curves of Figures 45, 46, and 47. On the average, greater isolation had been achieved in the lateral direction (in excess of 30 dB). In addition,

- (a) the active dampers do not change the high-frequency isolation performance of the suspension because for high frequency modes, the critical damping coefficients are higher. The active dampers, on the other hand, have constant damping coefficients so that the modal damping factors are lower at higher frequencies.

- (b) The high Payload response peak at 1,370 Hz in the radial direction is due to acoustic excitation of the aluminum tube, a fact which was verified by the frequency response curves of Figure 50 and 51. (The corresponding tests will be described in greater detail subsequently.)

The performance of the suspension system in the 2-4 direction can be established in similar manner via examination of Figures 41 and 42. Isolation ranges from 30 dB to 40 dB.

Dampers are used to limit the relative displacement amplitudes between the Payload and the Cage Structure which are worse at low frequencies (in various rigid-body modes). In lateral directions, the effectiveness of active dampers is directly measured by the reduction of the magnitude of the relative velocities at low frequencies. Examination of frequency response curves of Figures 40 and 48 indicate that 20 dB and 35 dB reductions of rigid-body response amplitudes have been achieved by the active dampers in the 2-4 direction. Rigid-body resonance peaks were completely eliminated by the active dampers.

In the axial directions, direct measurements of the relative response amplitudes were not made. The effectiveness of the SFD's must be obtained via comparison of the acceleration frequency response curves near the rigid-body modes. With the specimen in the IA configuration, the SFD reduced the acceleration response of the Cage Structure by 10 dB, and the Payload by 21 dB.\*

With the specimen in the horizontal orientation (Configurations IB & IC), frequency response curves of Figures 43 and 44 indicate that approx-

---

\*Tests II B-2 and II C-2, at 12 Hz.

imately 17 dB of response amplitude reduction was achieved by the SFD at 12 Hz.

Frequency response curves of Figures 50 and 51 are results of a simple experimental investigation of acoustic susceptibility of the Payload tube at high frequencies. A normal frequency sweep was first conducted with the specimen in configuration IB and the excitation in the 1-3 direction. The following signals were recorded on magnetic tape: Cage Structure Acceleration, Payload Acceleration (mid-span of the aluminum tube, in the 1-3 direction), the sound level (with a microphone placed near the Payload), and the drive signal from the oscillator (a sine sweep). The frequency response curve of the Payload is plotted on both Figure 50 and Figure 51 (Curve a). The Cage Structure frequency response is plotted as Curve b in Figure 51. With the external shaker electrically disconnected and with a loudspeaker driven by the taped-sound signal, the response curve of the Payload was again obtained, Curve b, Figure 50. The recreated sound had been adjusted so that the level was approximately the same as that during the original shake test, as shown by Curve c, Figure 50 and Curve c, Figure 51. The peak at 1,270 Hz on Curve b, Figure 50 leaves no doubt that the corresponding peak on Curve a was due to acoustic excitation.

#### 6.2.6 Conclusions

Based on Phase II test results presented and discussed above, the following may be concluded:

- (a) The suspension system functions according to design. A minimum high-frequency acceleration isolation of 20 dB was achieved over a wide frequency range of interest.

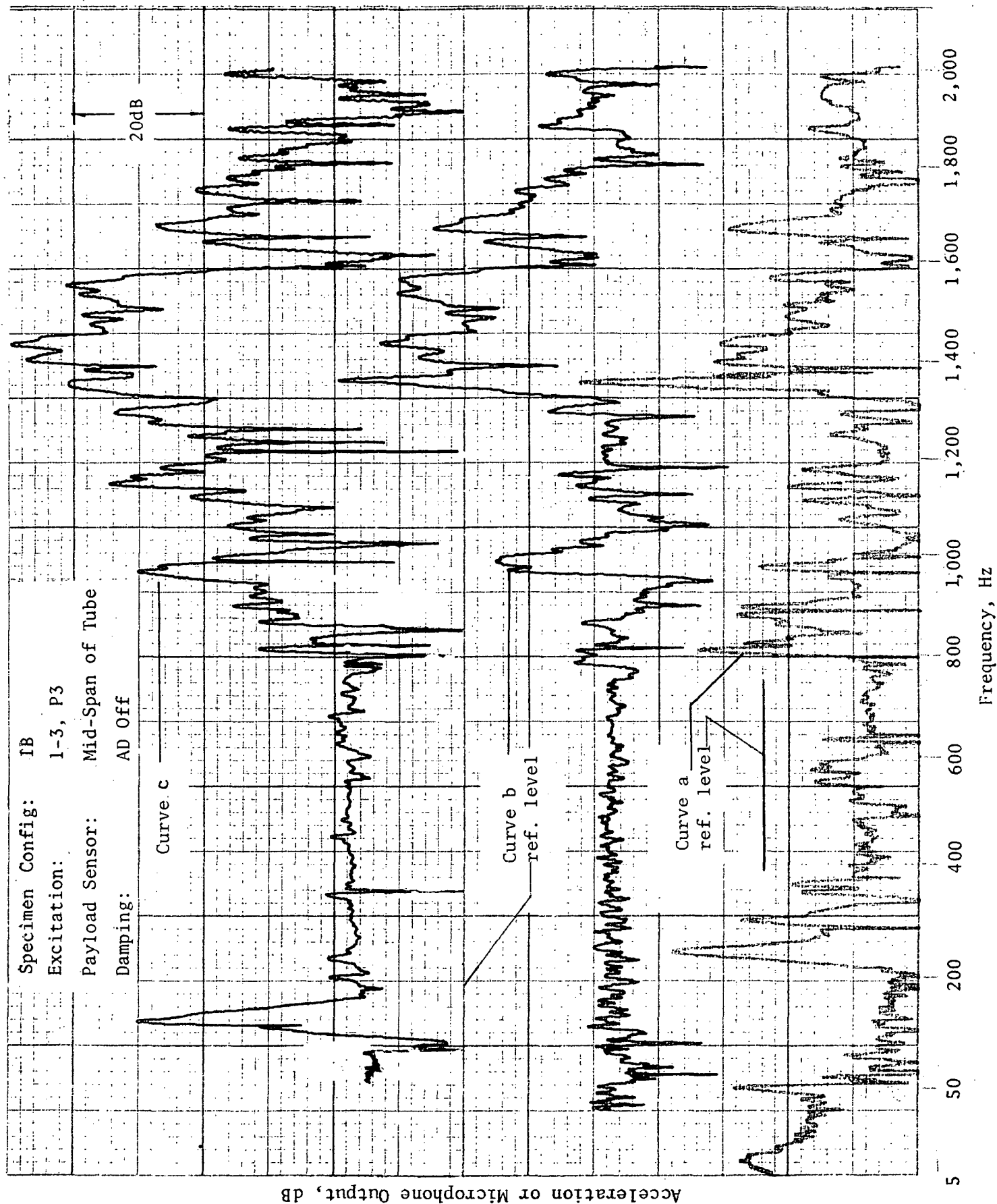


Figure 50 Test IIP, Acoustic Test, Part 1

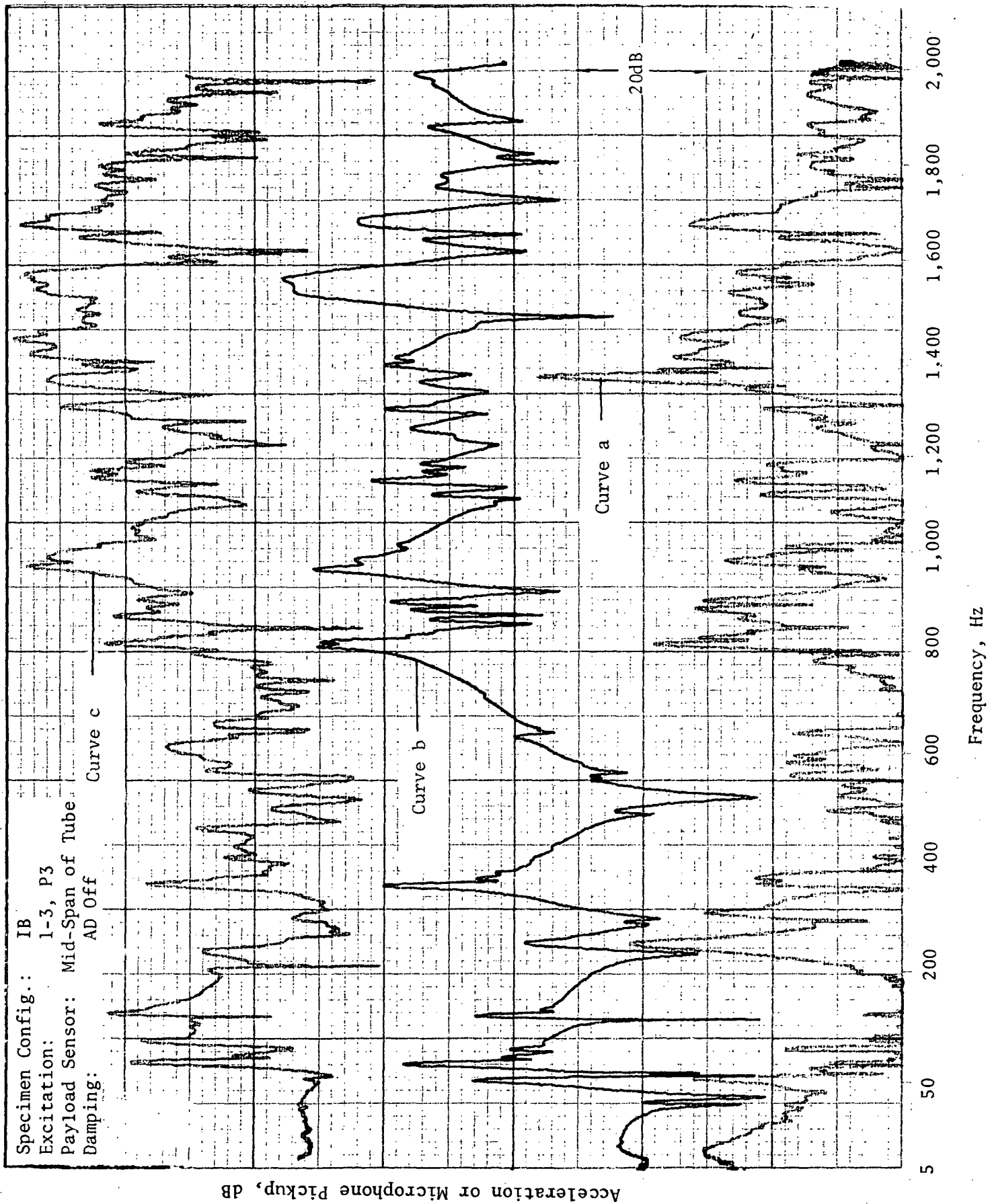


Figure 51 Test IIQ, Acoustic Test, Part 2

- (b) The active dampers do not provide dynamic coupling at high frequencies. The isolation performance of the suspension system was not hampered by them.
- (c) The active dampers are very effective in reducing the relative amplitudes in lateral rigid-body modes.
- (d) The squeeze-film dampers are effective in reducing the relative amplitudes in the longitudinal rigid-body mode.
- (e) However, the rigidized squeeze-film dampers do reduce the degree of vibration isolation provided by the suspension system at high frequencies.

### 6.3 PHASE III TESTS

#### 6.3.1 Test Objectives

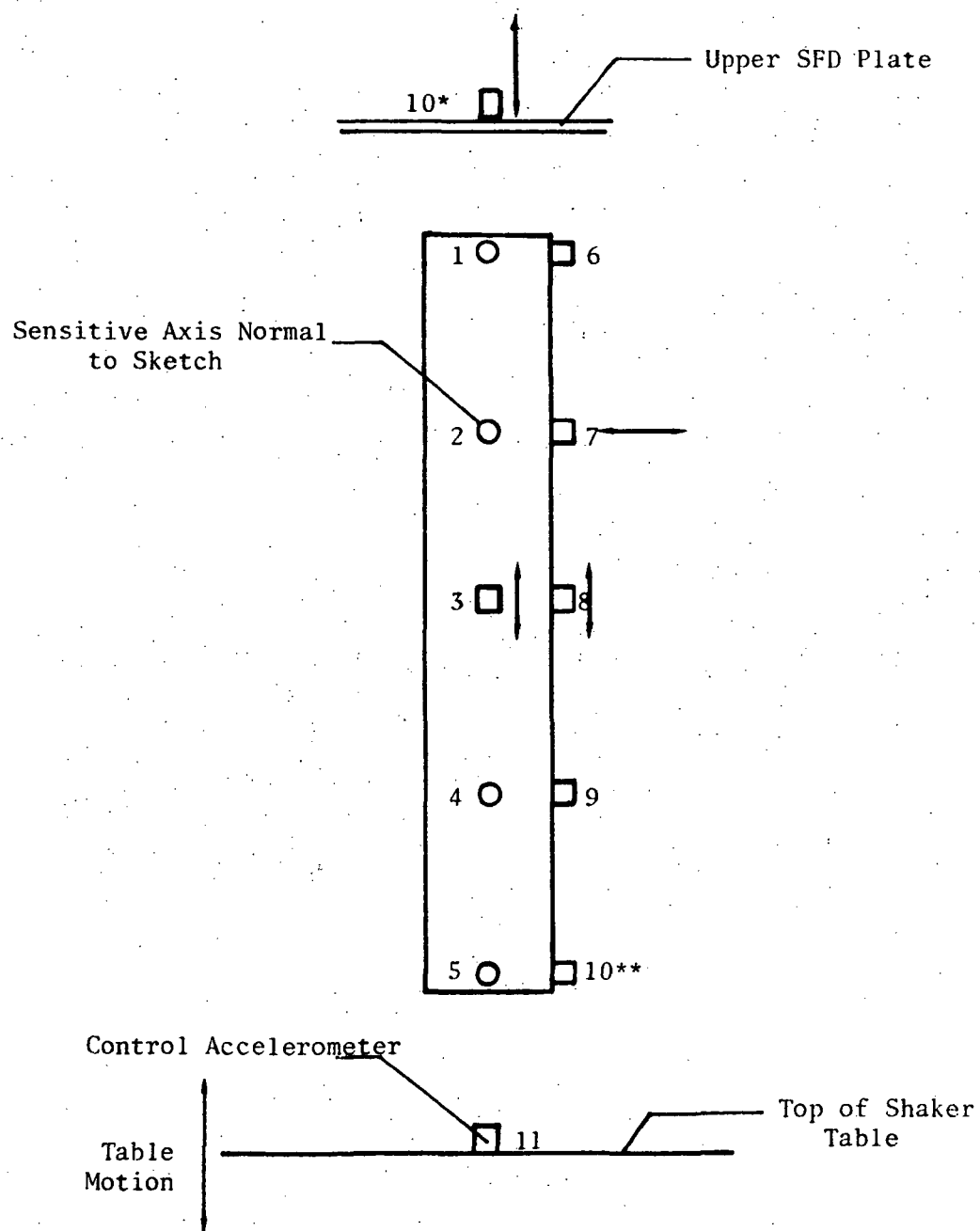
Phase III tests were conducted at LaRC's Structural Dynamics Laboratory on a Calidyne Model 249 shaker to evaluate the performance of the isolation system under prescribed "base" acceleration environments. In particular, this 28,000-lb. shaker was used to cover those frequencies where the Cage Structure could not be excited to significant amplitudes in Phase II tests. Phase II checkout tests also served as qualification tests of the entire system.

#### 6.3.2 Instrumentation

Eleven Piezotron\* accelerometers were used to measure the shaker table and payload accelerations. Accelerometer locations and orientation are shown in Figure 52. All response signals were recorded on 14-track FM tape at 7.5 ips.

---

\*Kistler Series 815 A.



\* For Tests 013, 014, 015, & 016

\*\* For Tests 017, 018, & 019

Figure 52 Accelerometer Locations, Orientations, and Designations for Phase III Tests

### 6.3.3 Test Setup

The specimen was disassembled at NTI after completion of Phase II tests for shipping. After reassembly, the Cage Structure was inserted into the payload compartment of the Orbiter model. Matching holes were drilled in the Cage Structure, the Mounting Brackets (NTI DWG 20095) and the Orbiter to ensure proper installation. The Cage Structure was then removed from the Orbiter and the specimen was completely reassembled.

For tests in the longitudinal direction, four brackets (parts 4, NTI DWG 20099) were inserted into the main tubes of the Cage Structure from below. A 2.54-cm aluminum plate (Part 1, NTI DWG 20099) was used as the interface between the shaker table and the specimen, see Figure 53.

For lateral vibration tests, the 2.54-cm plate was again used. Four cylindrical spacers were needed to raise the specimen from the shaker table, Figure 54.

With the specimen mounted in either of the above orientations with respect to the shaker axis, two additional static preload conditions of the suspension system were simulated by tilting the shaker to a 45° orientation with respect to vertical, Figure 55.

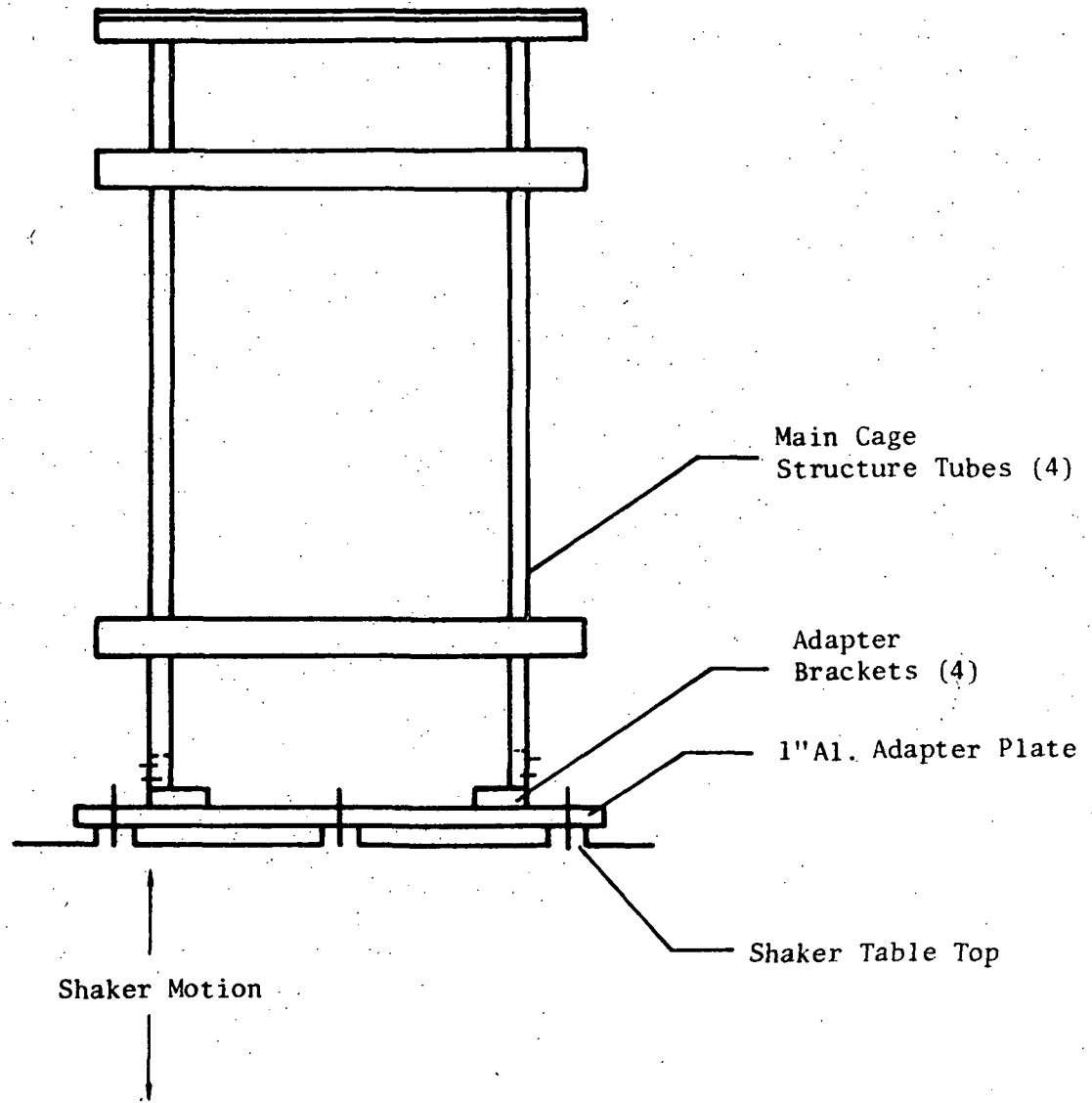
### 6.3.4 Test Procedure

The following tests were conducted

Test No.	Shaker Orientation	Excitation (Table acceleration)		Level
		Direction	Characteristics	
013	vertical	longitudinal	sine sweep	A
014	45°	longitudinal	sine sweep	A
015	vertical	longitudinal	random	B
016	45°	longitudinal	random	B
017	vertical	lateral 2-4	sine sweep	C
018	vertical	lateral 2-4	random	B
019	vertical	lateral 2-4	sine sweep	D

Table III Phase III Test Summary





Note: Payload, Lower Damper Plate and Ring are not shown for clarity.

Figure 53 Specimen - Shaker Interface Schematic  
(Tests 013, 014, 015 & 016)

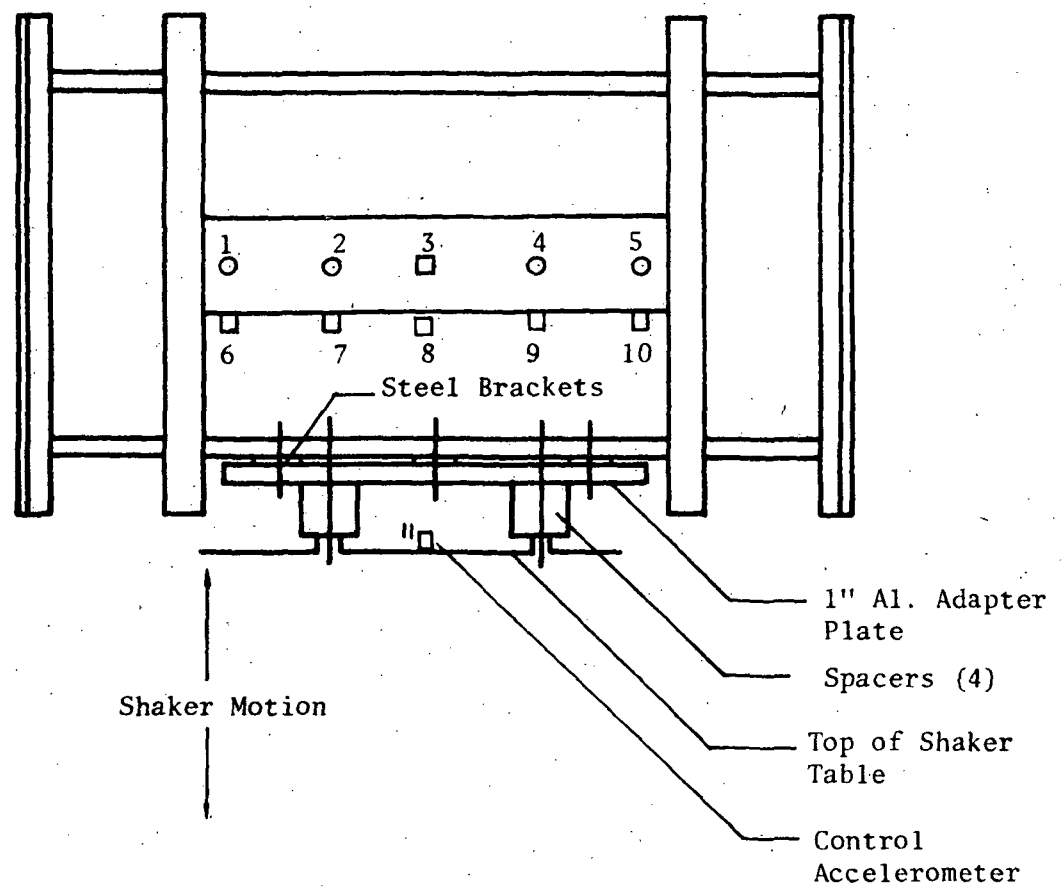


Figure 54 Specimen - Shaker Interface Schematics  
(Tests 017, 018 & 019)

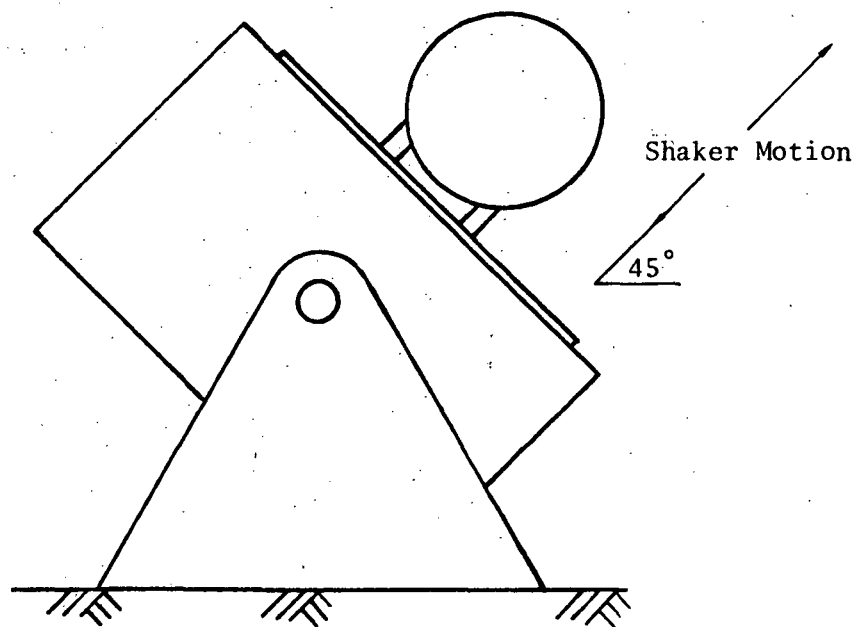
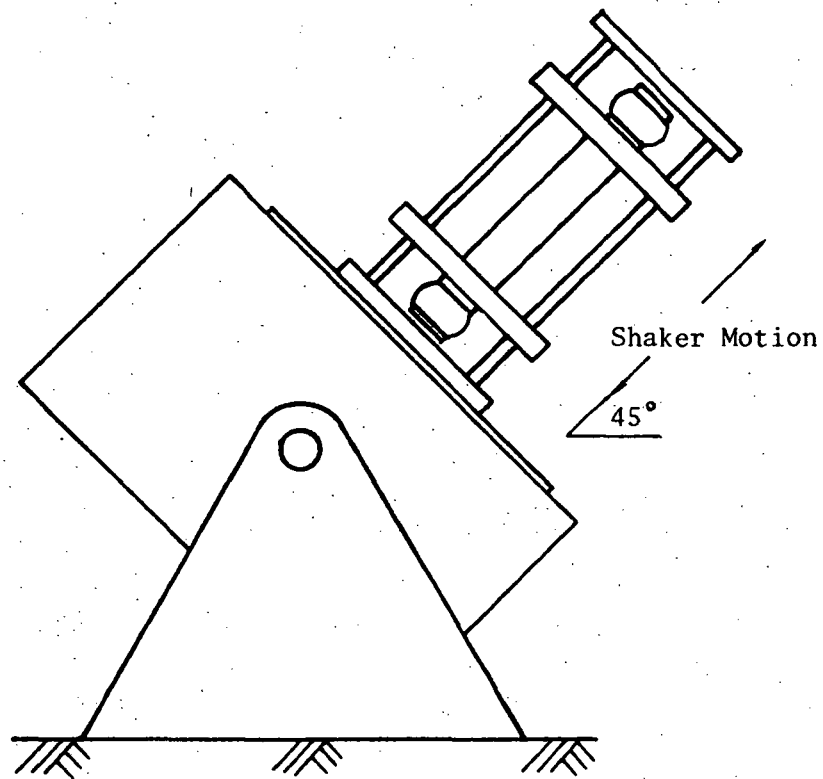


Figure 55 45° Tests

Excitation levels were:

- A: 0.32 g, o-pk, 11.2 - 2,000 Hz, and  
0.025 in, o-pk, 5 - 11.2 Hz
- B: 11 - 2,000 Hz band limited, random "white" noise
- C: 0.15 g, o-pk, 13.2 - 2,000 Hz  
0.037 in, o-pk, 5 - 13.2 Hz
- D: 1.3 g, o-pk, 30 - 400 Hz

The 5 - 2,000 Hz sweeps were covered in 12 minutes. The same (logarithmic) sweep rate was also used for the 30 - 400 Hz sweeps, each of which took approximately 4 minutes.

Accelerometer output signals were recorded on FM magnetic tape, at 7.5 ips. Tape track assignments correspond to the transducer numbering system, with the following additions:

- Track 12: Blank
- Track 13: 1Vrms reference sine wave
- Track 14: Time code
- Edge Track: Voice

The following recording sensitivities were used:

Test No.	Sensitivity, g/full scale		
	Tracks 1-9	Track 10	Track 11 (Control Accelerometer)
013 & 014	1.0	10.0	1.0
015 & 016	1.0	10.0	2.0
017	0.1	0.1	.5
019	1.0	1.0	2.0

#### 6.3.5 Test Results and Dimensions

The recorded data were analyzed subsequently at NTI. Sine sweep results for key responses are shown in Figures 56-61, 64-66, and 68-71. Random response data were analyzed with the DS 121 Tracking Filter, using a 10-Hz filter. Acceleration spectral density curves are shown in Figures 62, 63, and 67.

In the vertical orientation, the isolation system performance in the longitudinal direction is demonstrated in Figure 56. Above 75 Hz, the isolation is, in general, 20 dB or better. The effect of isolation is clearly indicated when Figures 56 and 57 are compared. In Figure 57, the response curve of the upper damper plate (transducer 10) and the shaker input acceleration (transducer 11) are plotted. The damper is part of the Cage Structure and its response may be considered as typical of what the payload would go through if the isolation system were not present. Between 100 Hz and 600 Hz, the damper plate response is consistently higher than the input and is, at worst, some 55 dB above the isolated payload.

Response curves in Figures 59, 60, and 61 provide certification that the isolation system performed equally well or better under a different static preload condition (due to the 45° orientation with respect to the vertical).

Excellent performance of the isolation system in the lateral direction is indicated by the response curves in Figures 64, 65, and 66. Isolation of 40 dB or more is typically obtained for frequencies above 75 Hz.

The active damper capabilities would have been exceeded in Test 019 if the same input were applied at low (rigid-body) frequencies. The performance of the isolation in the 30 - 400 Hz band is illustrated in Figures 68-71.

Typical random test results are shown in Figures 62, 63, and 67. It is seen that the isolation system performance is preserved under wide-band excitation.

During Tests 013 and 014, it was observed that cavitation would occur in the squeeze-film damper grease if higher input excitation were

used. This problem would appear to be one of the chief limitations of the present squeeze-film damper design.

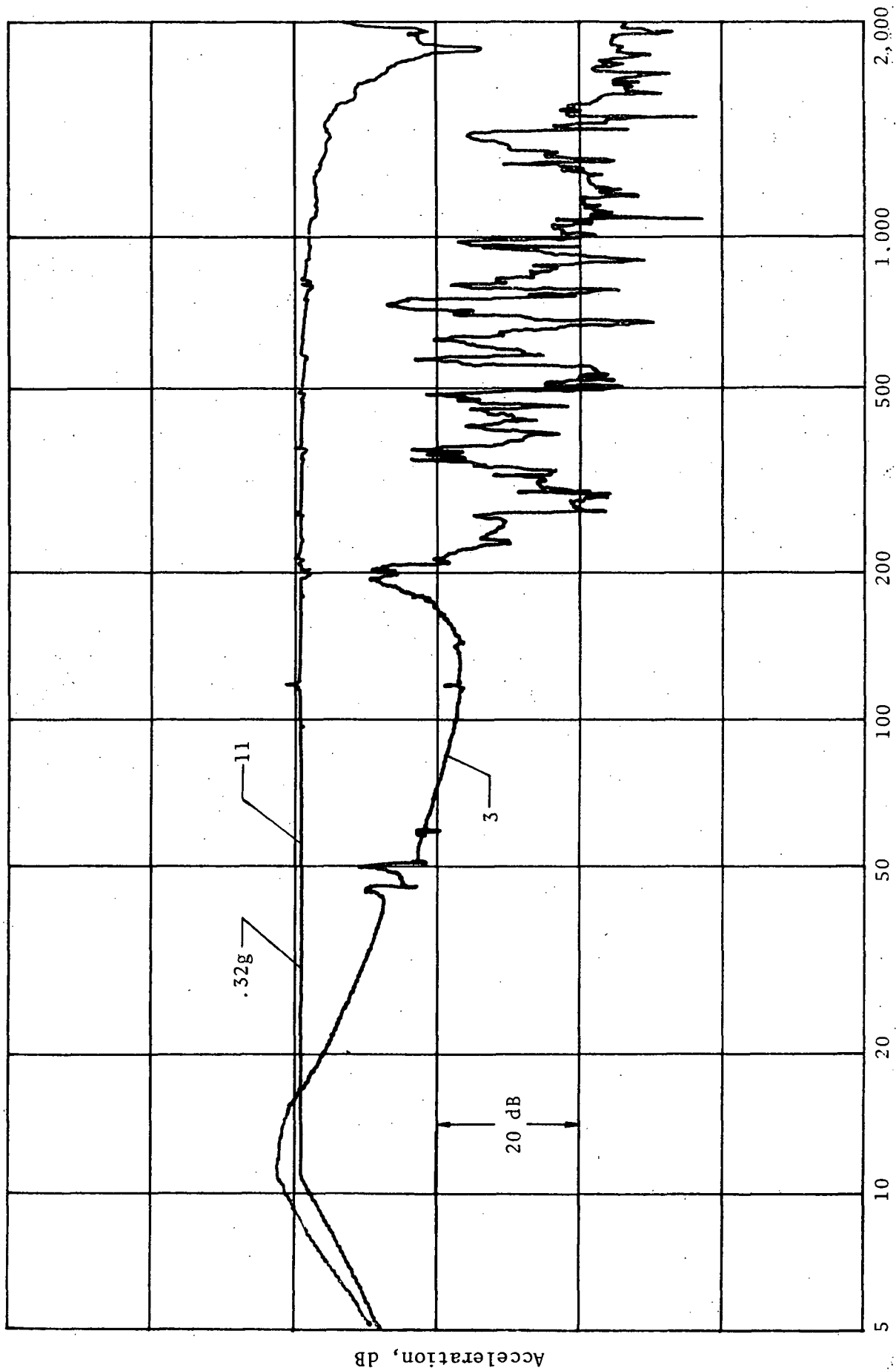


Figure 56 Test 013, Transducers 3 & 11

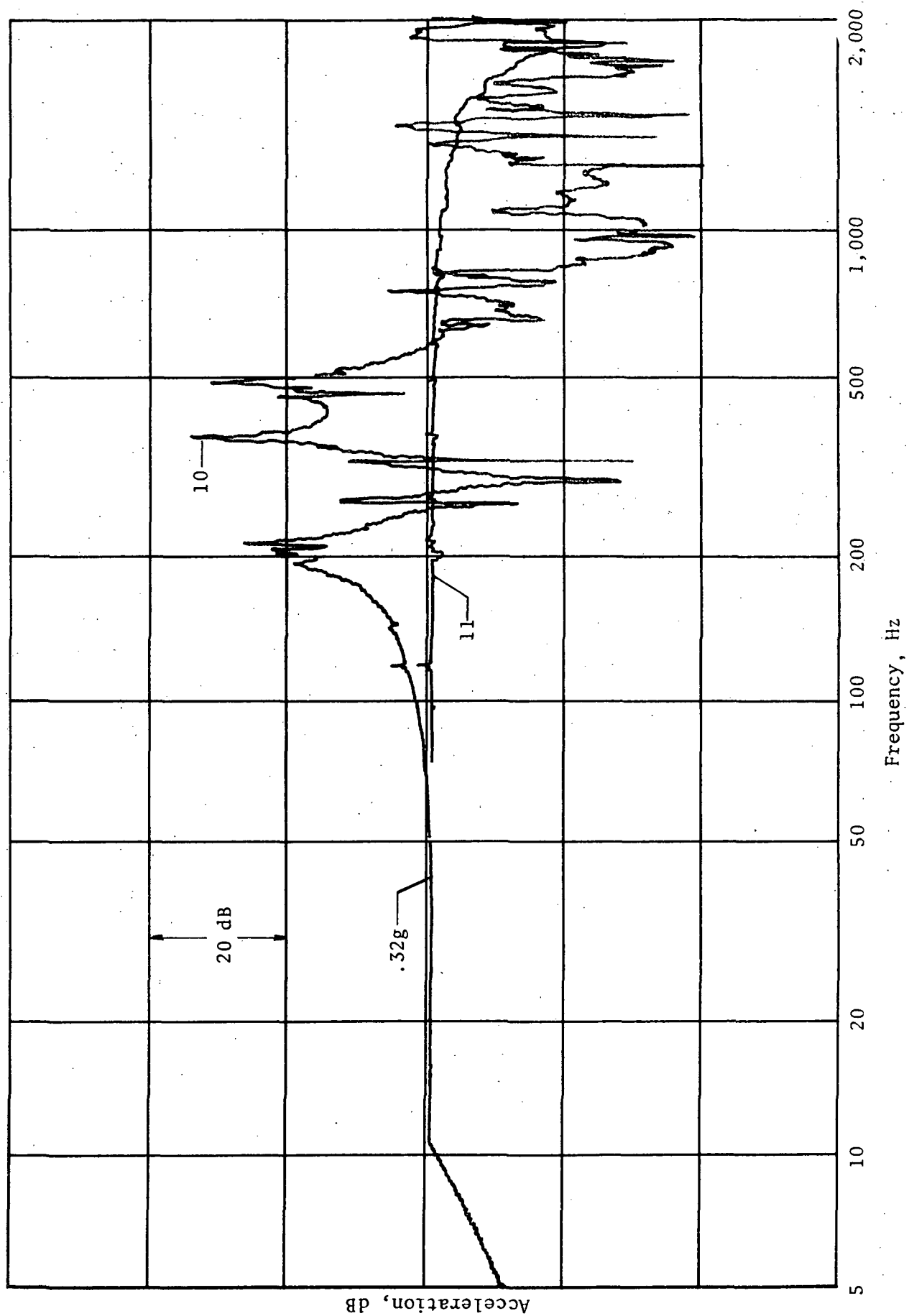


Figure 57 Test 013, Transducers 10 & 11



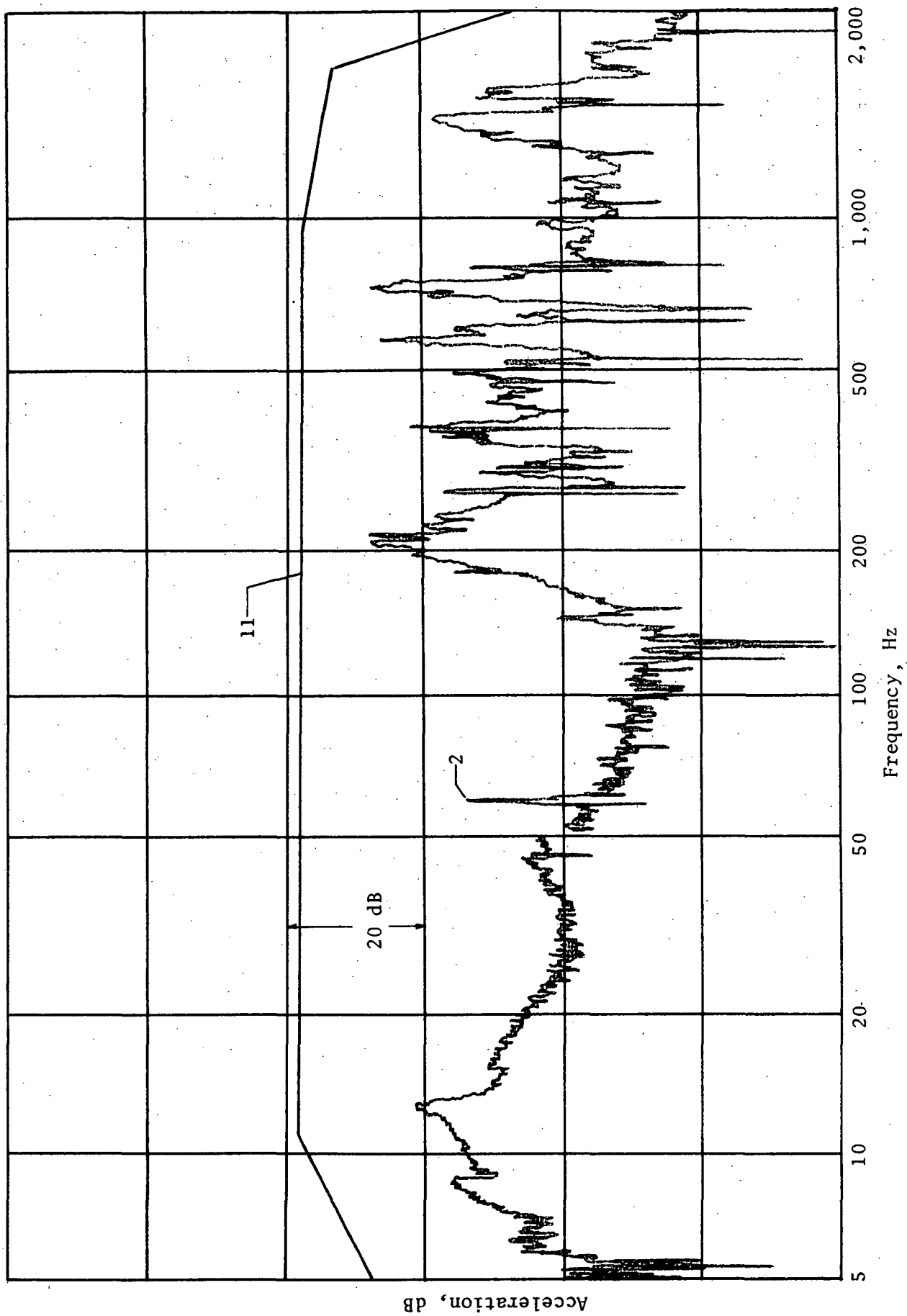


Figure 58 Test 013, Transducers 2 & 11

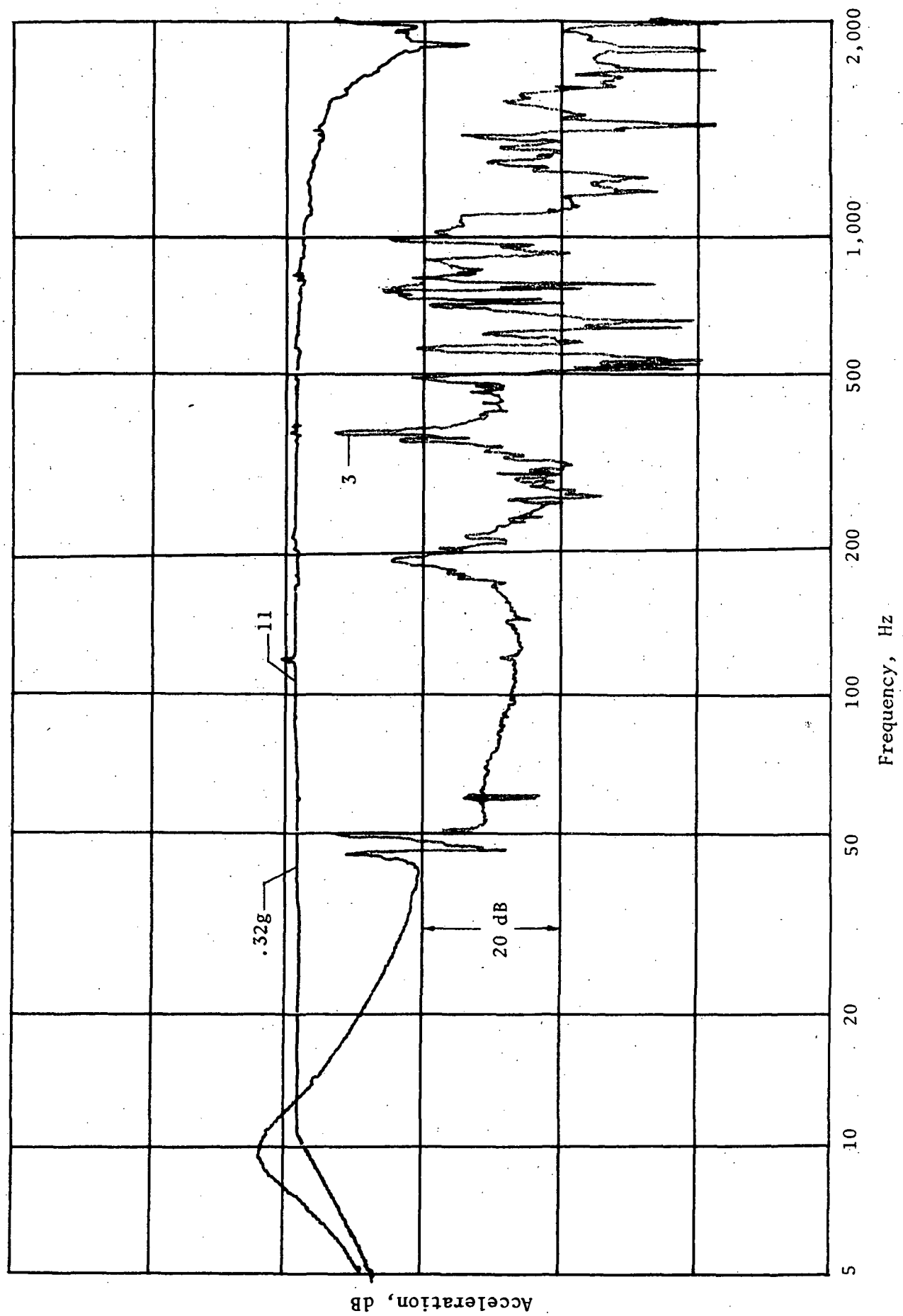


Figure 59 Test 014, Transducers 3 & 11

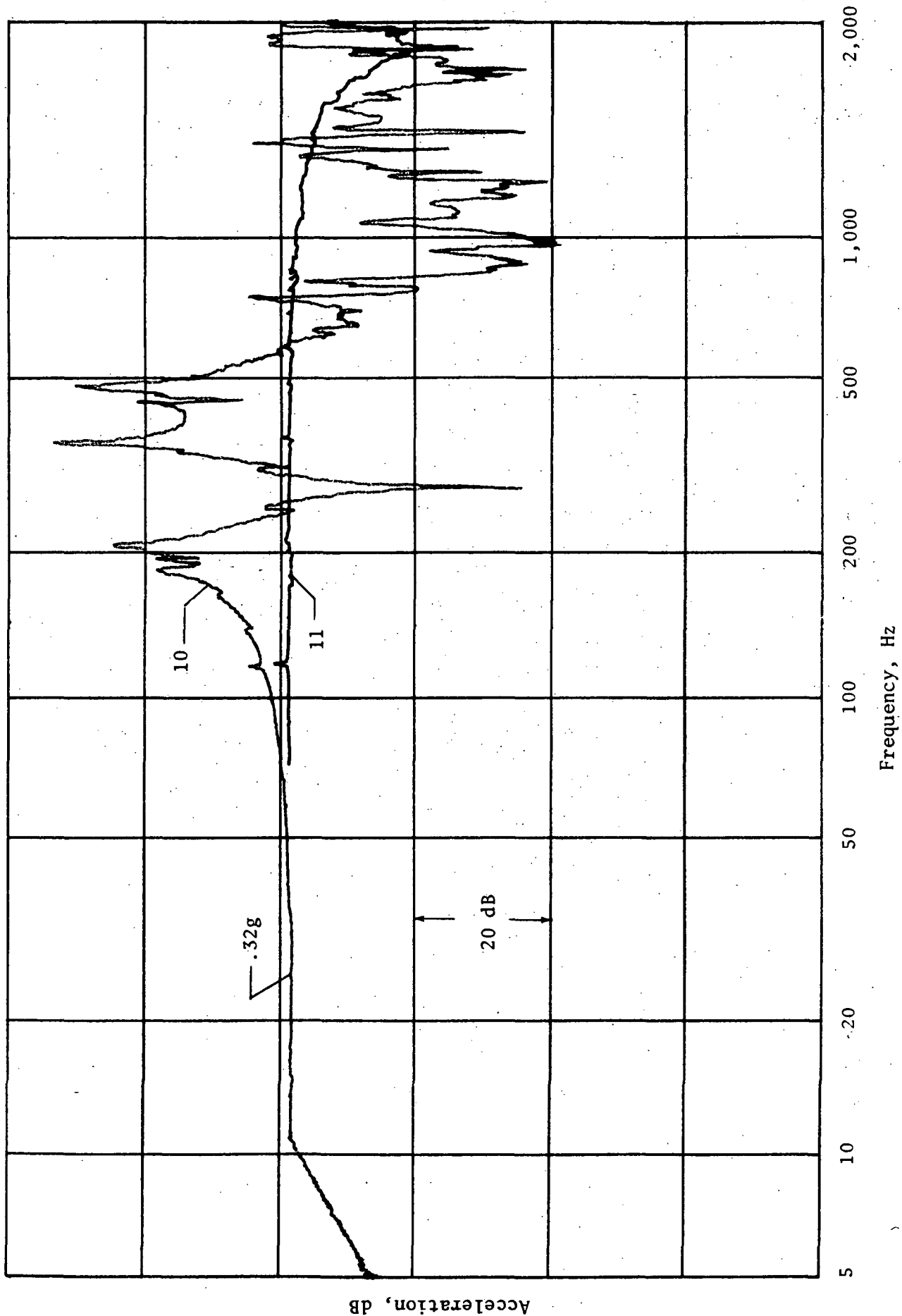


Figure 60 Test No. 014, Transducers 10 & 11

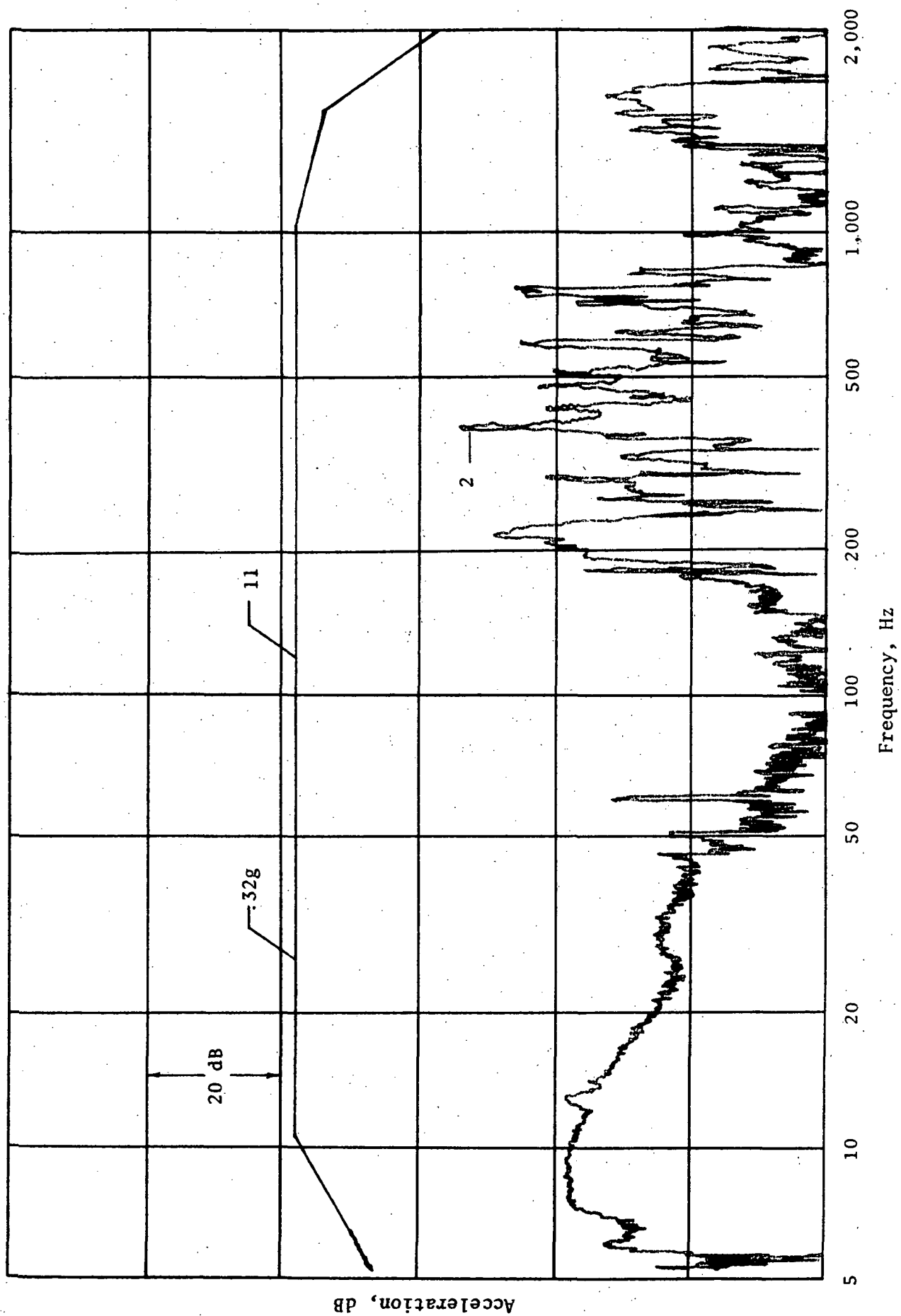


Figure 61 Test 014, Transducers 2 & 11

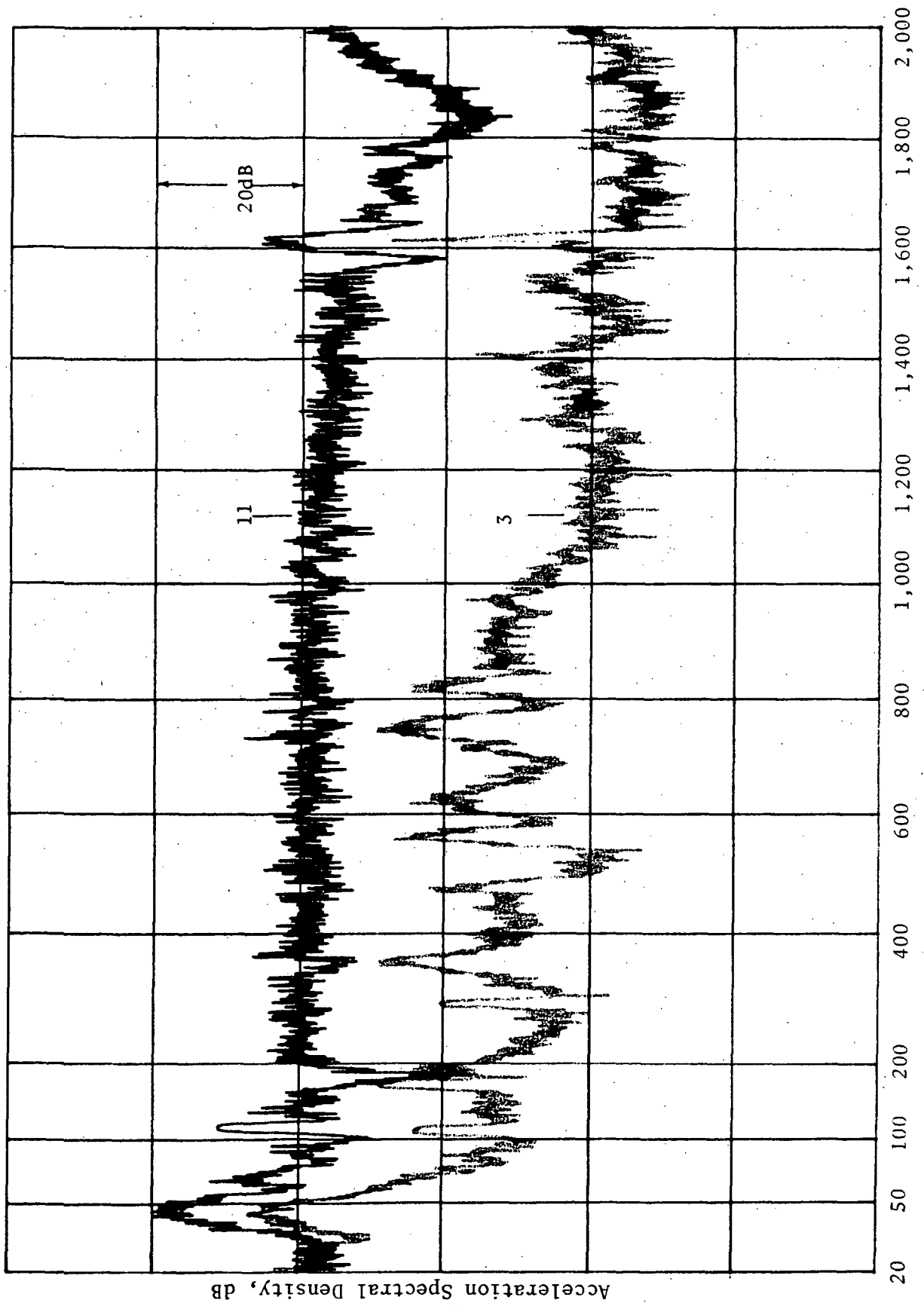


Figure 62 Test No. 015, Transducers 3 & 11

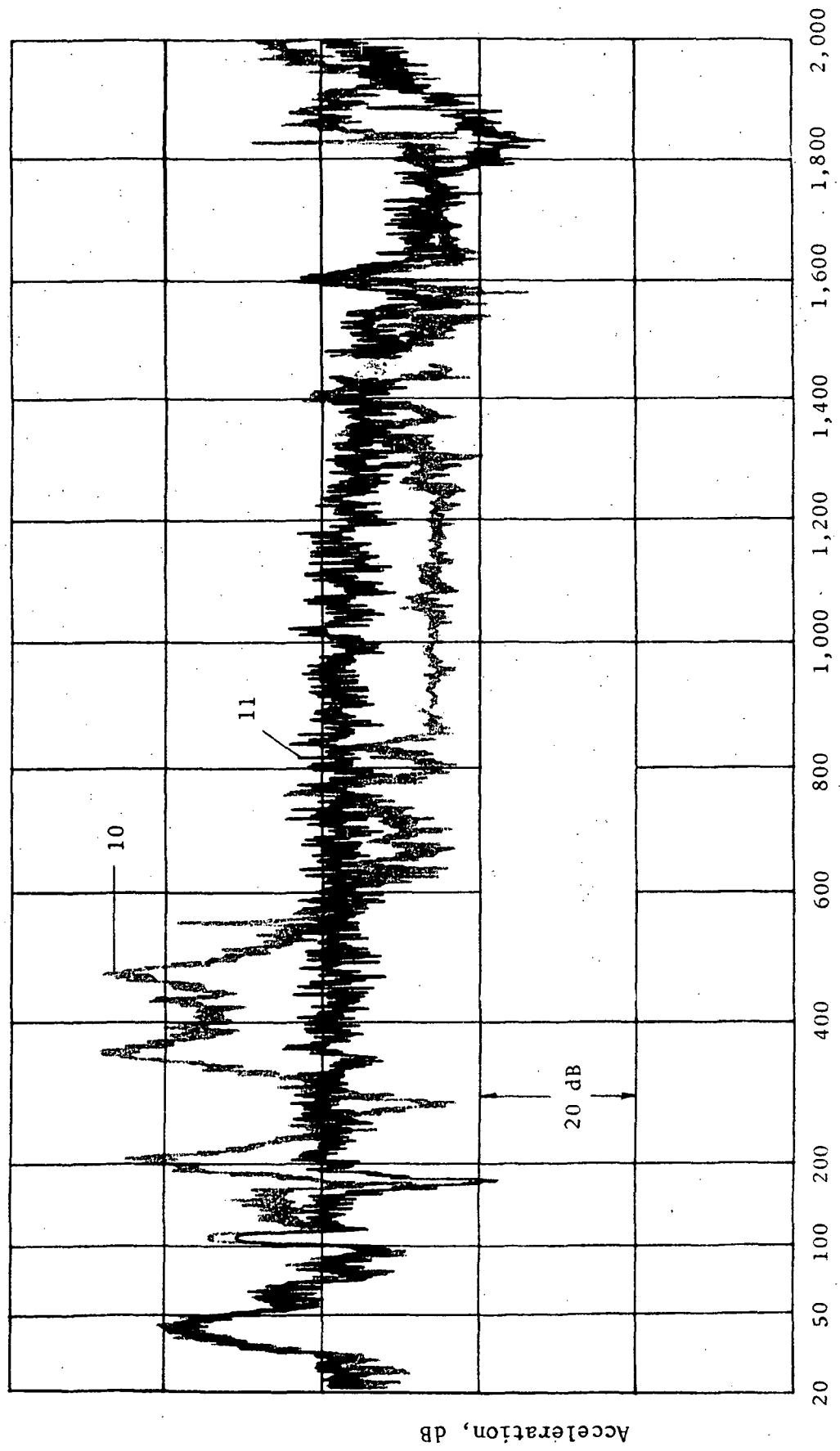


Figure 63 Test 015, Transducers 10 & 11

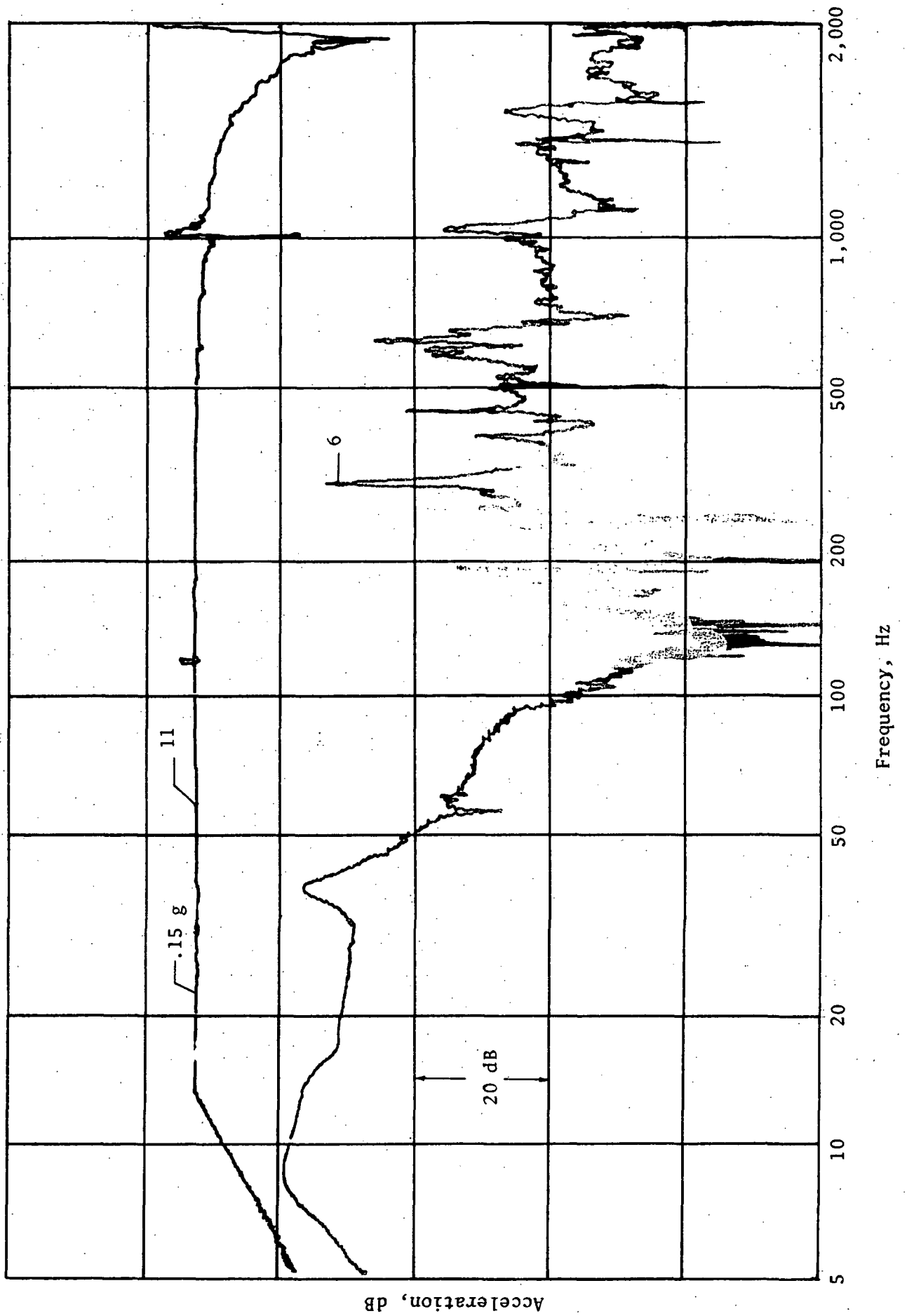


Figure 64 Test 017, Transducers 6 & 11

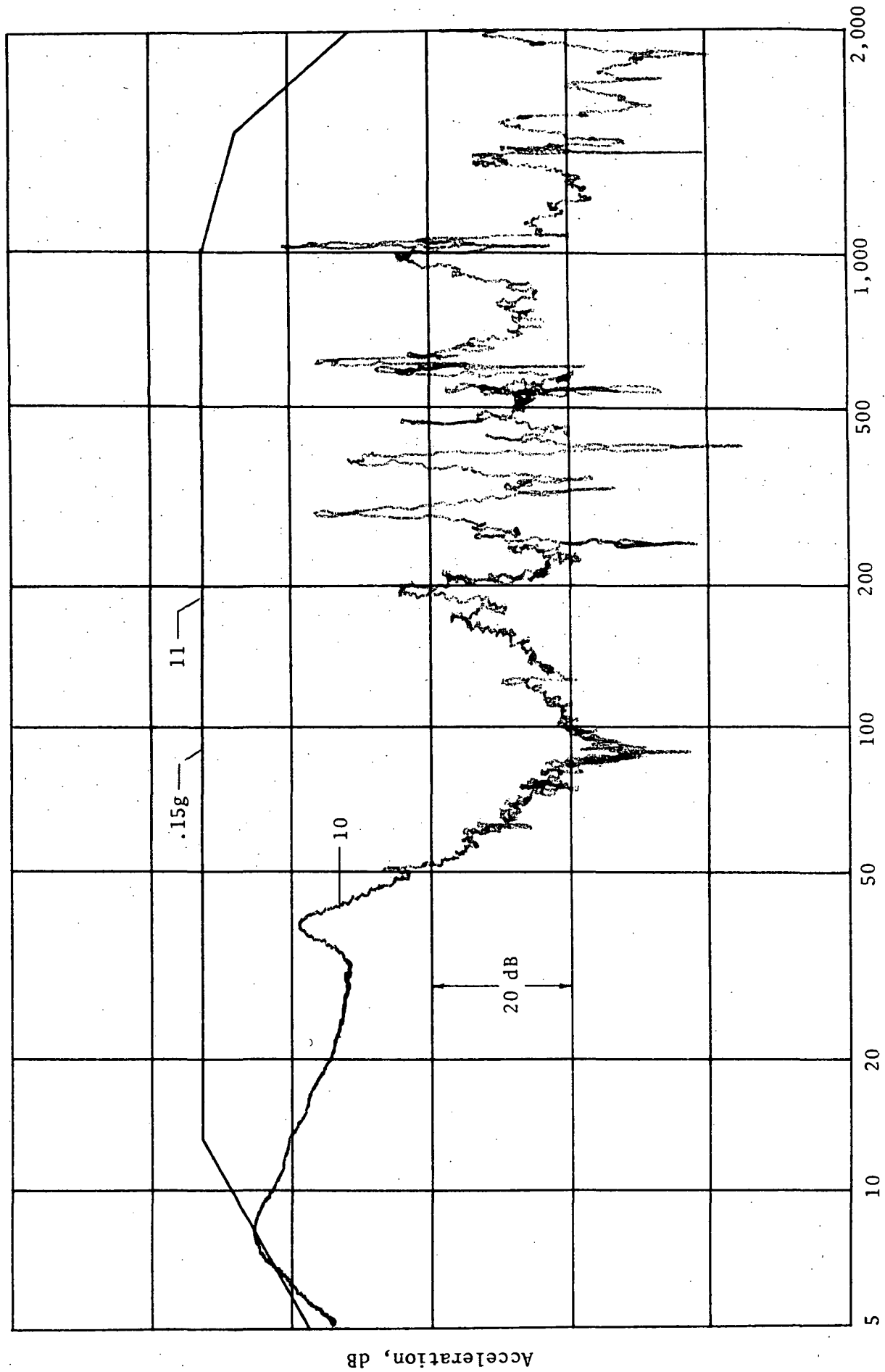


Figure 65 Test 017, Transducers 10 & 11



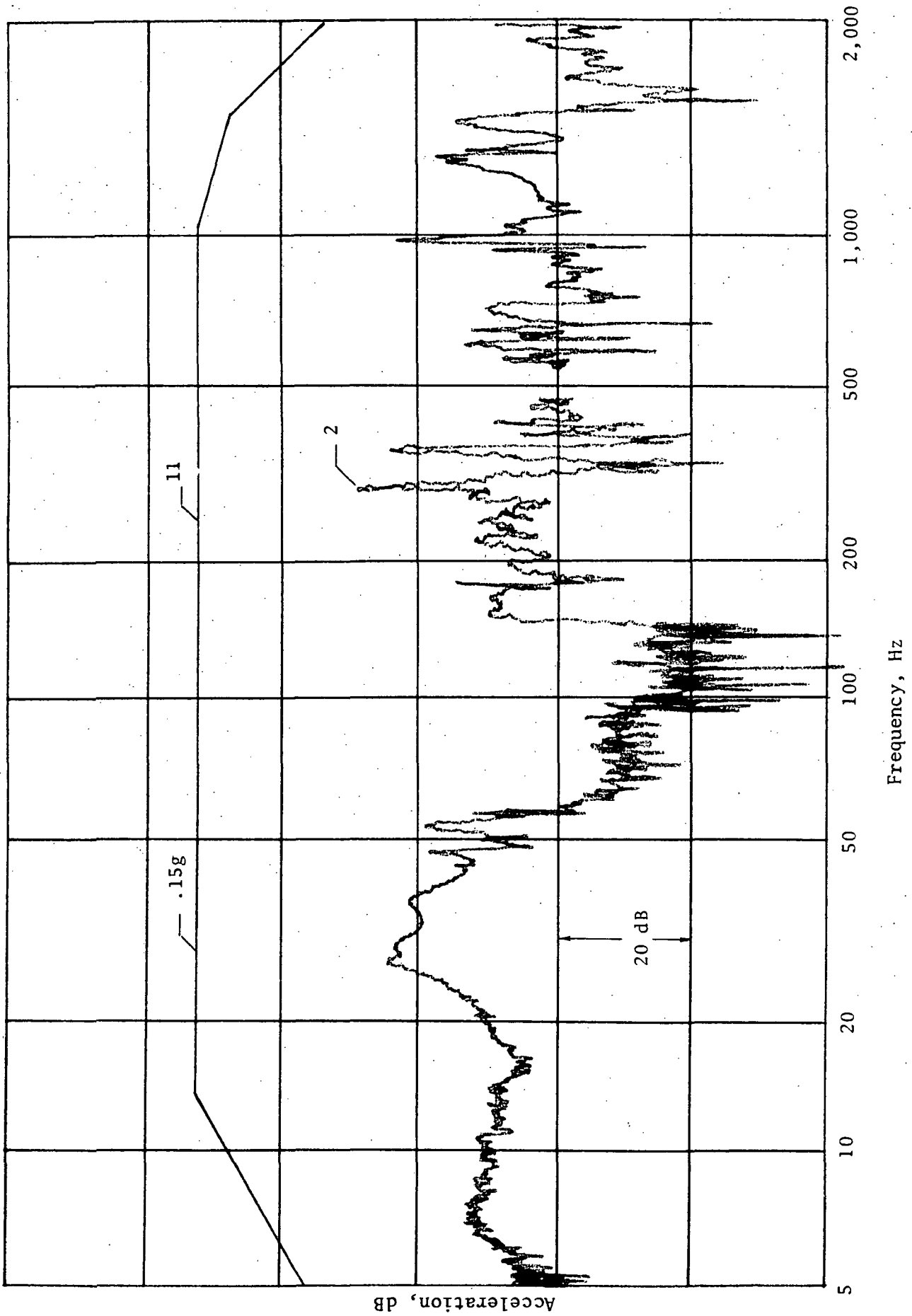


Figure 66 Test 017, Transducers 2 & 11

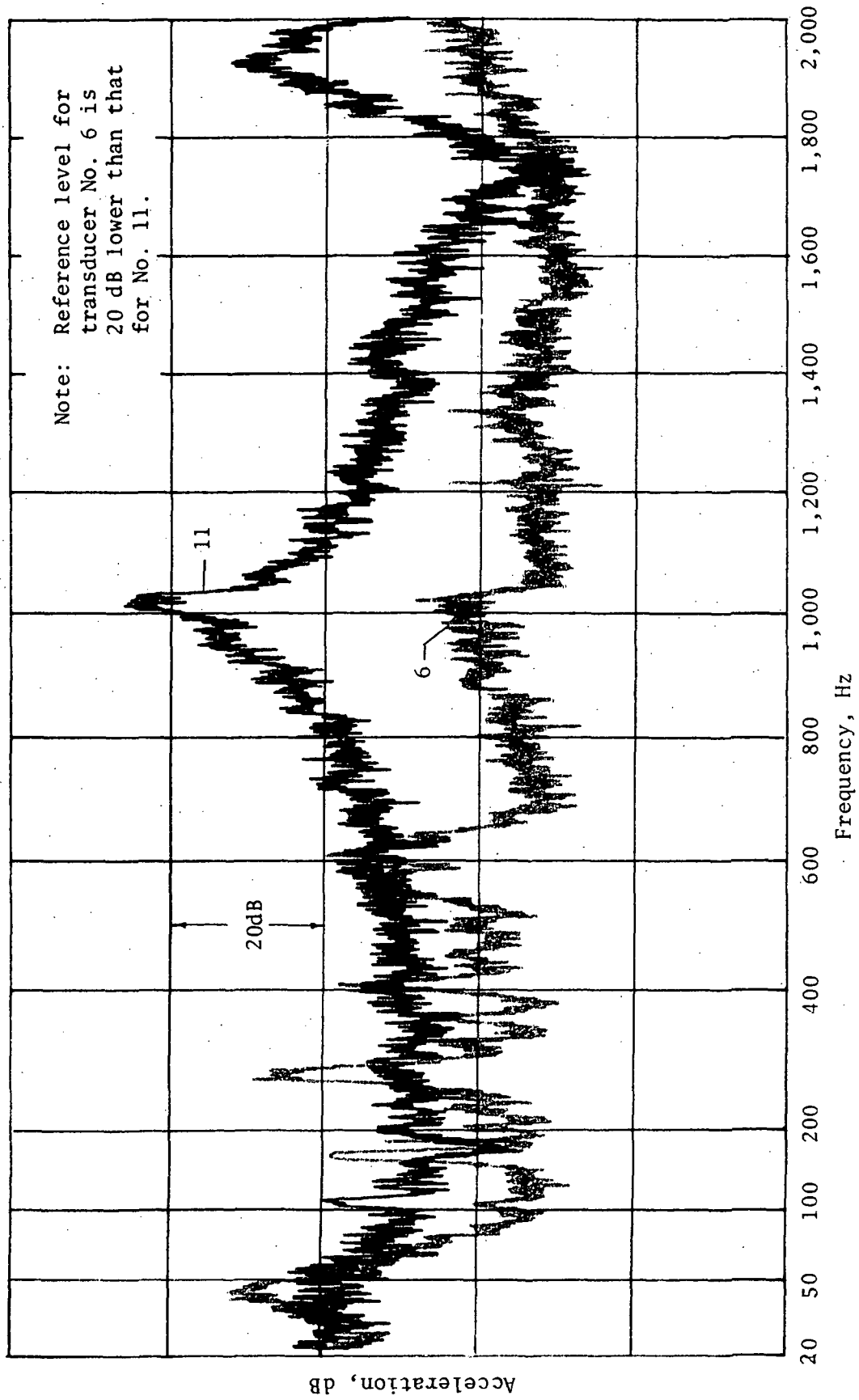


Figure 67 Test 018, Transducers 6 & 11

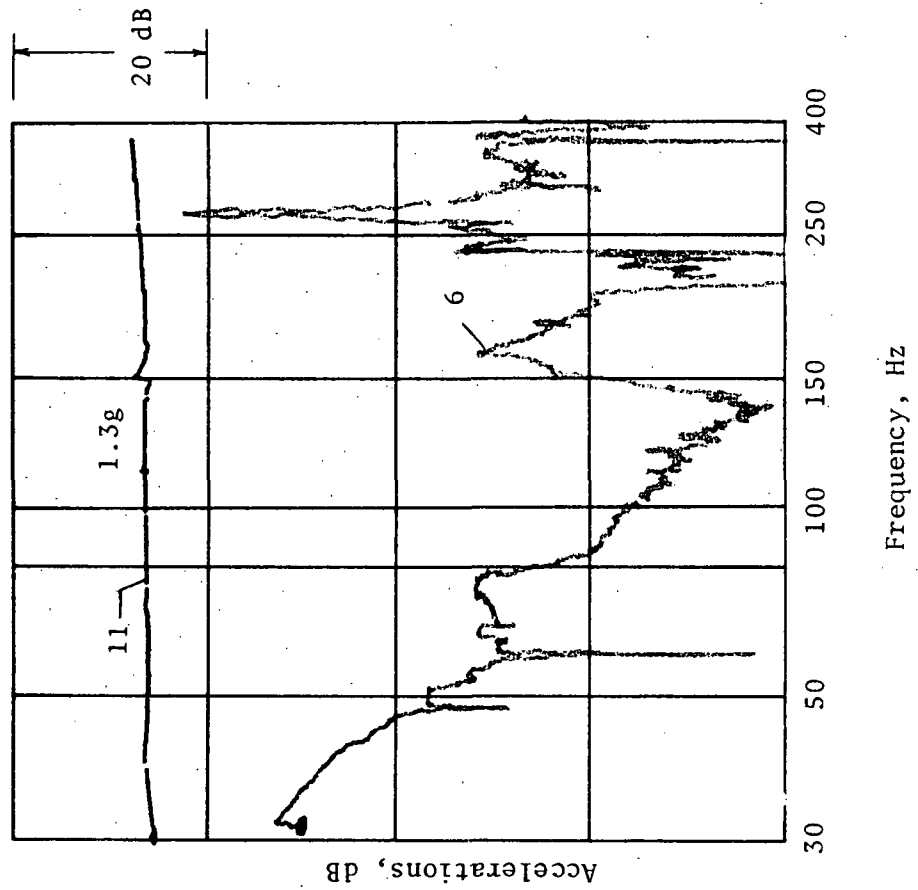


Figure 68 Test 019, Transducers 6 & 11

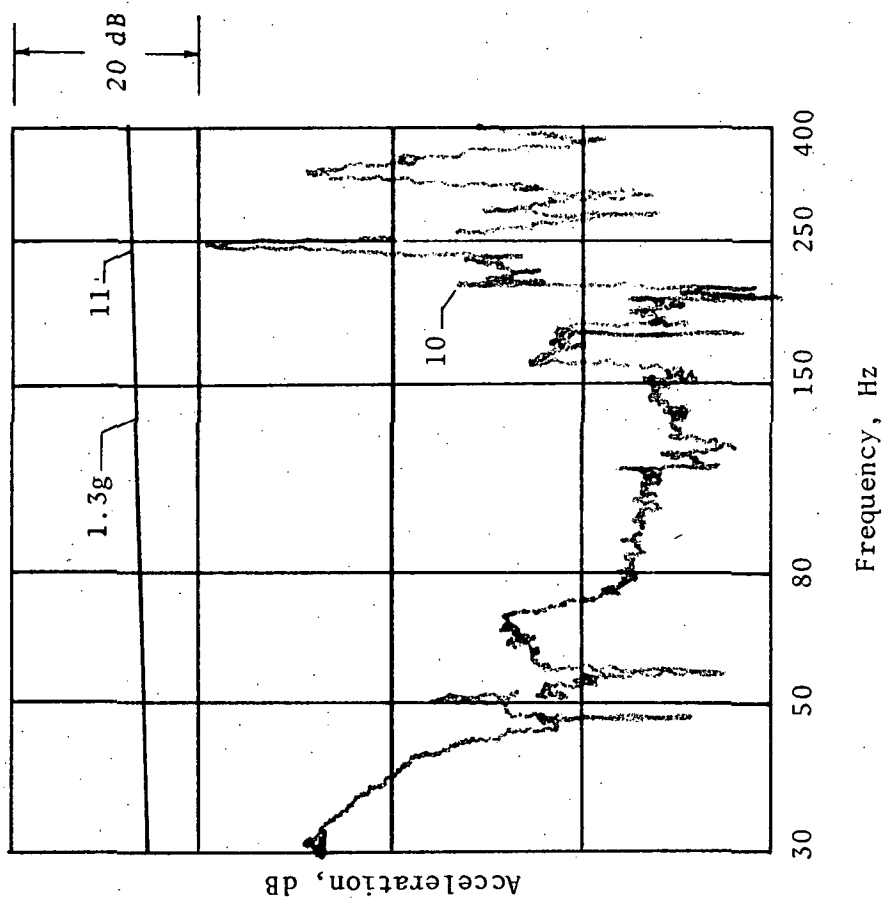


Figure 69 Test 019, Transducers 10 & 11

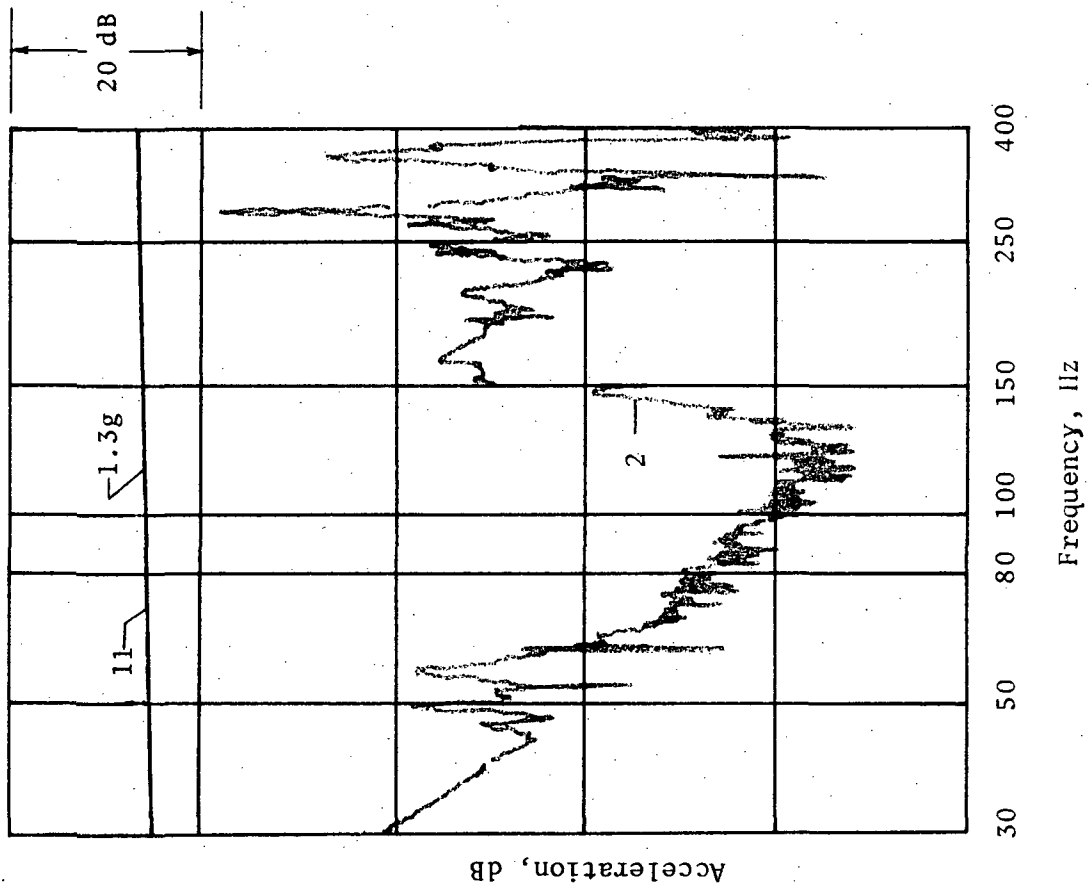


Figure 70 Test 019, Transducers 2 & 11

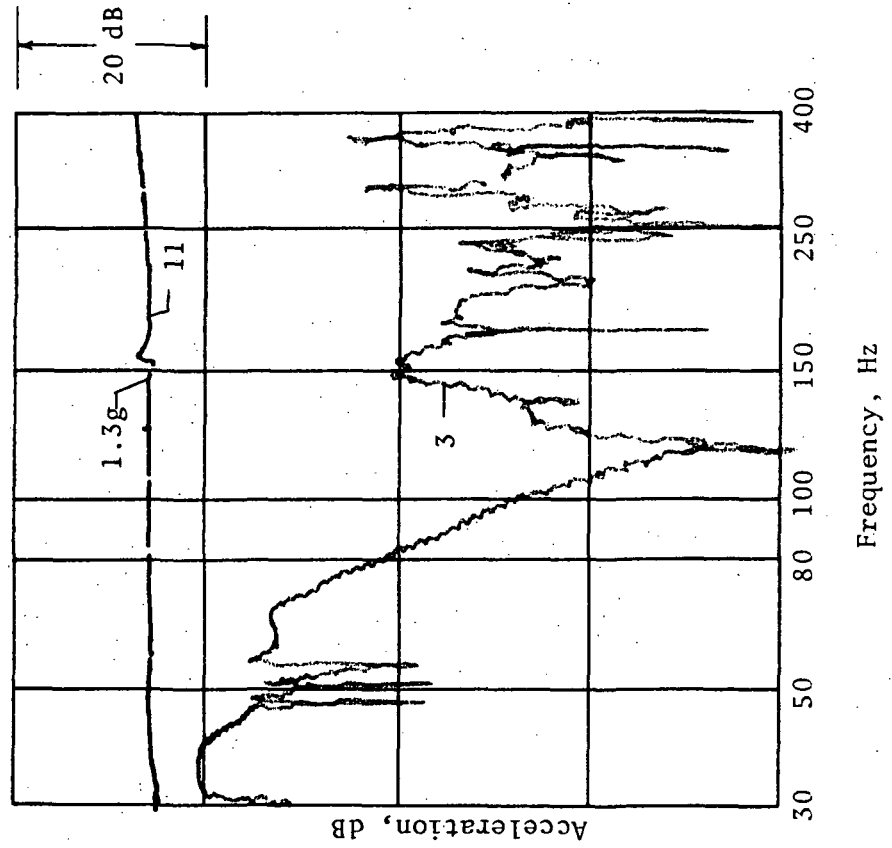


Figure 71 Test 019, Transducers 3 & 11

## Section 7

### CONCLUSIONS AND RECOMMENDATIONS

#### 7.1 CONCLUSIONS

##### 7.1.1 Suspension System

In as much as measured suspension characteristics agreed with design analyses predictions, it may be concluded that scaling of the pretensioned cable design to the full-scale is practical and feasible. The simplicity of the system configuration, the wide range of available stiffness adjustment and the trouble-free nature of its operations indicate that the use of cables in the full-scale should be highly recommended.

##### 7.1.2 Squeeze-Film Dampers

The squeeze-film dampers were simple in design and effective in reducing low frequency relative displacements. Such inherent features of the squeeze-film dampers as high force-to-weight ratio and large tolerance to transverse displacement were fully utilized in the model.

Two near-extreme stiffnesses were experimented with for the damper support. Although it was not accomplished during the course of this study, it appears to be feasible that an optimum support stiffness could be developed to offer ideal low frequency damping and high frequency decoupling.

The main limitation encountered with the squeeze-film dampers was the cavitation of the grease at high levels of excitation and response. The solution to the problem is, perhaps, to put the working medium under pressure. Further parametric investigation of the squeeze-film damper appears to be in order for full-scale applications.

### 7.1.3 Active Dampers

The active damper system performed according to design. As a laboratory device, the system has proven itself in providing easily adjustable damping and, simultaneously, as a multi-channel shaker system.

A significant difference (about 6 dB) was discovered between the maximum usable gain in the two directions of the basic damper system. The underlying cause of the difference is thought to be the differences of the natural frequencies and mode shapes of the velocity sensor coil plate in the two different directions.

On account of weight and power consumption considerations, the active damper is probably not suitable for full-scale applications. As laboratory apparatuses, however, it appears to be versatile and useful in a number of applications.

## 7.2 RECOMMENDATIONS

### 7.2.1 In-Model Tests

The system should be installed in the 0.125-scale Orbiter and vibration tested and evaluated prior to any further investigation of the relative merits of isolating the entire payload package.

### 7.2.2 Squeeze-Film Dampers

Further parametric investigations of the squeeze-film dampers should be encouraged. Design equations and approaches should be developed for potential full-scale applications in both longitudinal and lateral damping for the isolation system.

### 7.2.3 Cable Suspensions

The cable system design, in its basic fundamentals, is recommended for full-scale system.



## REFERENCES

- 1 Grumman Aerospace Corporation DWG AD383-527, Module Inst. - Orbiter Payld.
- 2 Griffin, Richardson and Yamanami, "A Study of Fluid Squeeze-Film Damping," Trans. A.S.M.E., Vol. 88, Ser. D, No. 2, June 1966, pp 451-6.
- 3 S. Yamanami, "Study of Squeeze Action Damping of Gas Film," SM Thesis, Dept. of Mech. Engr., MIT, Cambridge, Mass., May 1962.
- 4 Davis, Philip, et. el., "Studies of the Flow, Bonding and Damping Characteristics of a Squeeze Film Under Dynamic Conditions," NASA Grant NGR 14-008-019, Southern Illinois University, Fluid Mechanics Research Laboratory, June 1970.
- 5 Applied Dynamics Research Corporation, "Space Shuttle Damper System for Ground Wind Load Tests," Final Report, NASA Contract NAS8-28613, April 1973.



1504-74